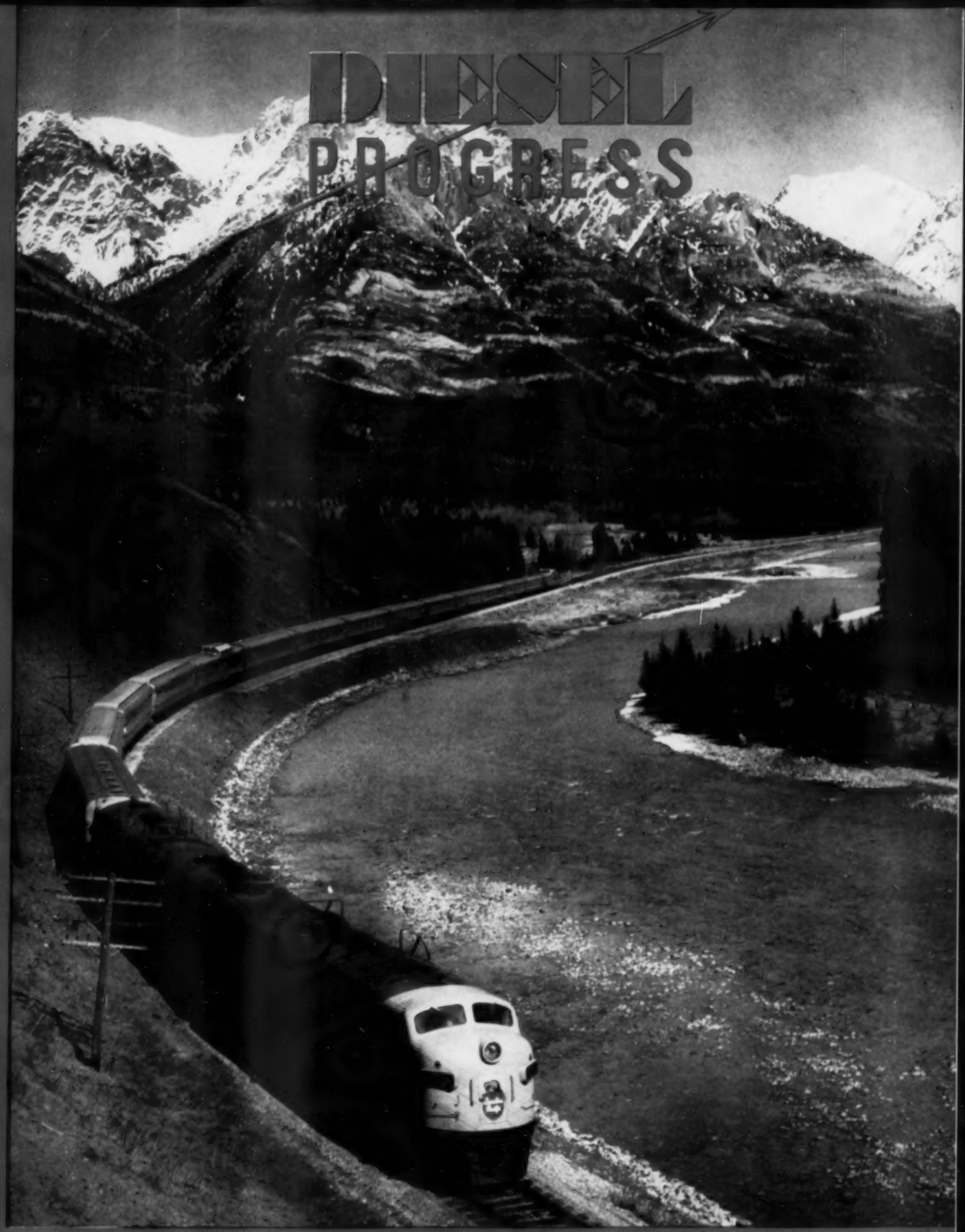
DIESEL PROGRESS

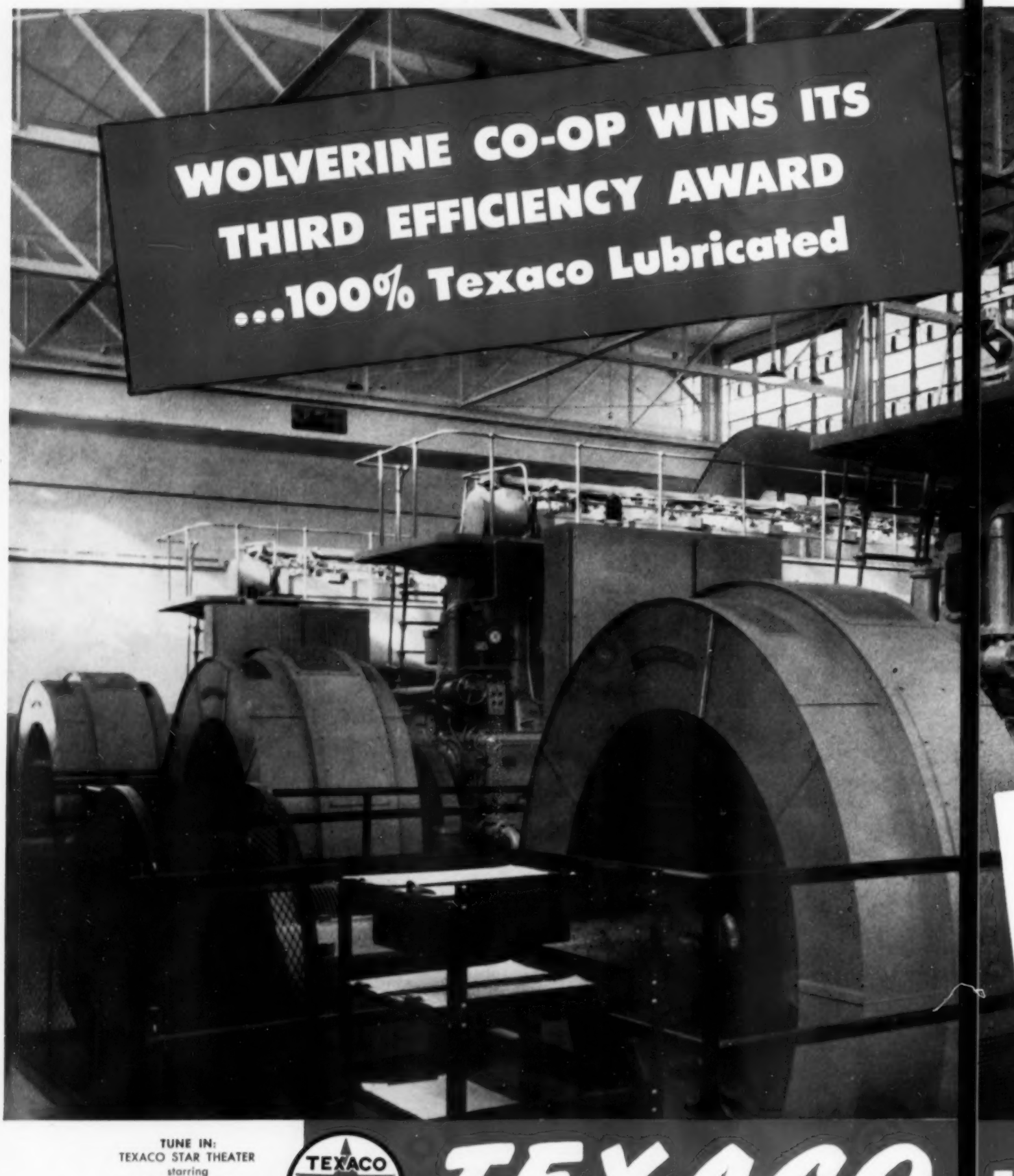
IN INDUSTRY • IN TRANSPORTATION • ON THE SEA • IN THE AIR



FIVE DOLLARS PER YEAR

APRIL, 1956

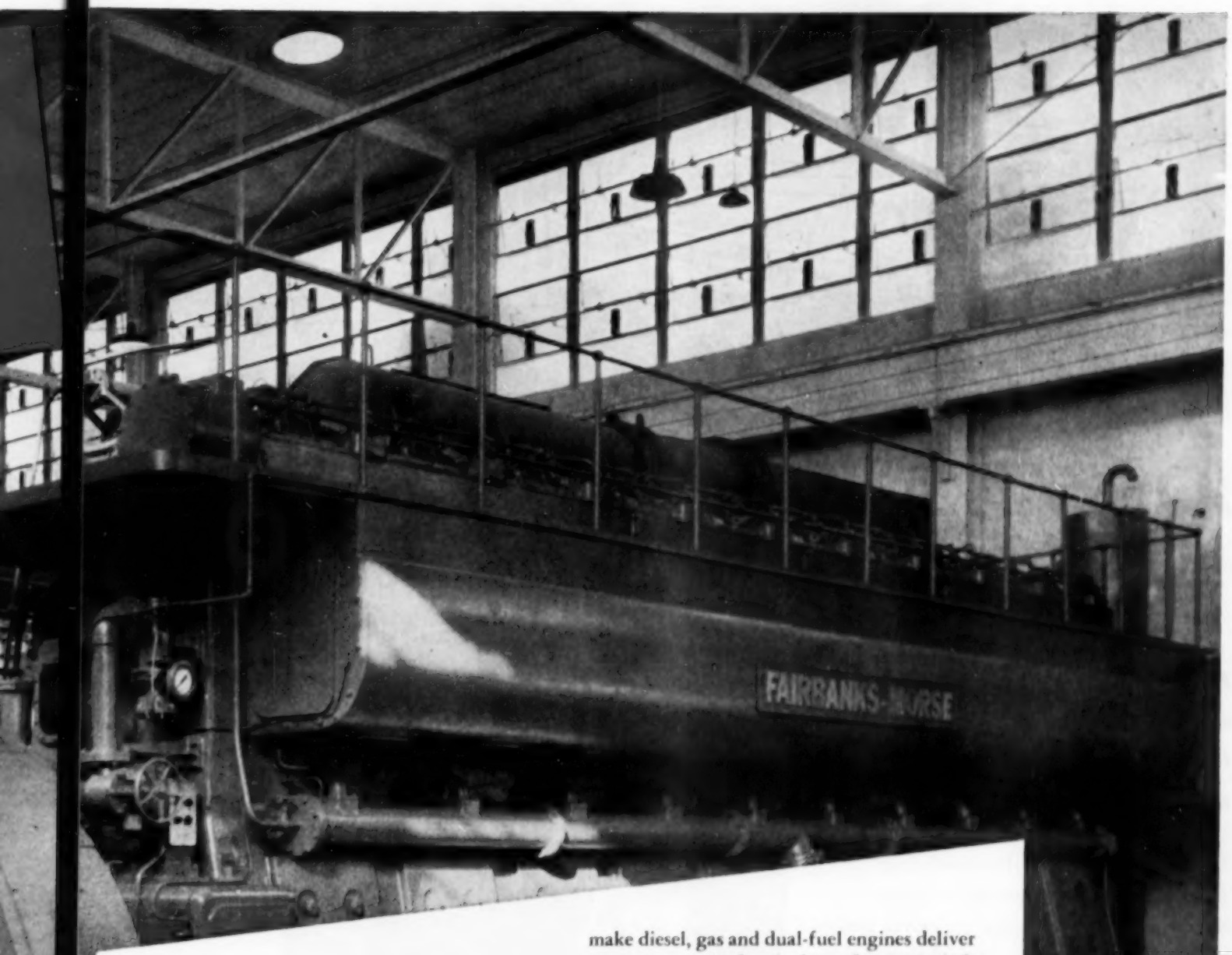
FIFTY CENTS PER COPY



TUNE IN:
TEXACO STAR THEATER
starring
JIMMY DURANTE
on TV Saturday nights.
METROPOLITAN OPERA
radio broadcasts
Saturday afternoons.

TEXACO

TEXACO



THREE TIMES now, the Hersey Plant of the Wolverine Electric Cooperative at Big Rapids, Michigan, has won the Diesel Progress award for efficient operation.

Texaco Ursa Oil Heavy Duty lubricates all six engines—three 10-cylinder Fairbanks-Morse units and three 8-cylinder Cooper-Bessemers. Average lube oil consumption is .000592 gallons/kwh. Fuel cost is only 5.14 mills/kwh.

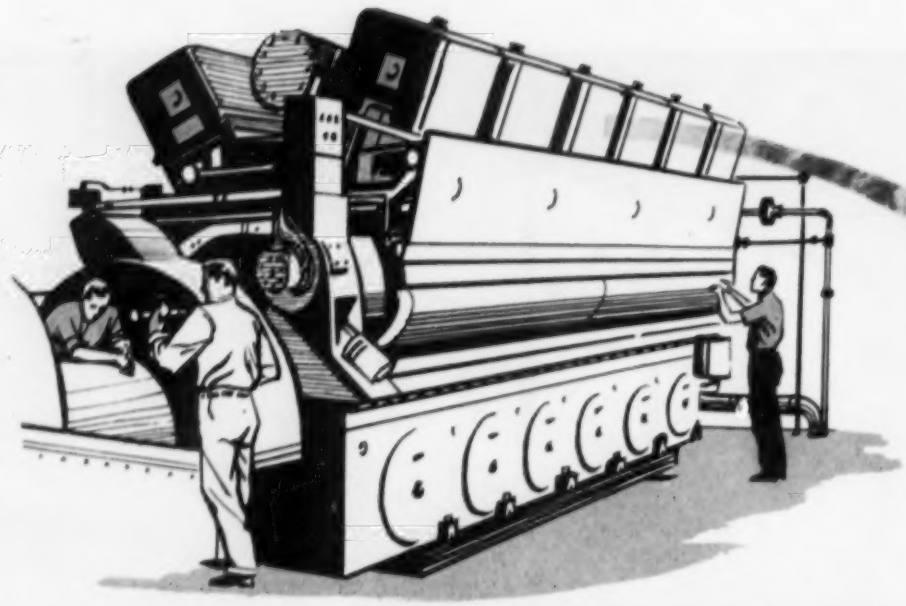
Texaco Ursa Oil Heavy Duty is one of the famous *Texaco Ursa Oil* series—designed to make diesel, gas and dual-fuel engines deliver *more power* with *less fuel* over *longer periods* between overhauls. These benefits, consistently delivered, are the reason why—

For over 20 years, more stationary diesel h.p. in the U. S. has been lubricated with Texaco than with any other brand.

A Texaco Lubrication Engineer will gladly help your plant win new highs in efficient operation. Just call the nearest of the more than 2,000 Texaco Distributing Plants in the 48 States, or write:

The Texas Company, 135 East 42nd Street, New York 17, N. Y.

URSA OILS FOR ALL DIESEL, GAS AND DUAL-FUEL ENGINES



BOOST DIESEL OUTPUT

with less fuel...less noise...less smoke

AiResearch Turbochargers give your stationary or mobile diesels more added horsepower than any comparable turbocharger or supercharger installation!

The application of AiResearch Turbochargers to stationary diesel equipment will overcome excessive noise and smoke problems... jump horsepower to a much higher level... and cut your fuel bills on a horsepower per hour basis.

In addition, it will restore operating efficiency for your diesel power plants at altitude.

Application of these finely engineered power packages to mobile diesel equipment is equally effective... as has already been demonstrated in the remarkable results achieved by the installation of AiResearch Turbochargers on Caterpillar diesel machinery.

AiResearch is the largest producer of small turbomachinery in the United States, with twenty-five *million* hours of experience. This unmatched experience explains why AiResearch Turbochargers lead in power, economy and dependability. Your inquiries are invited.

THE GARRETT CORPORATION

AiResearch Industrial Division

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DESIGNERS AND MANUFACTURERS OF TURBOCHARGERS AND RELATED MACHINERY

DIESEL and GAS ENGINE PROGRESS

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IN INDUSTRY · IN TRANSPORTATION · ON THE SEA · IN THE AIR

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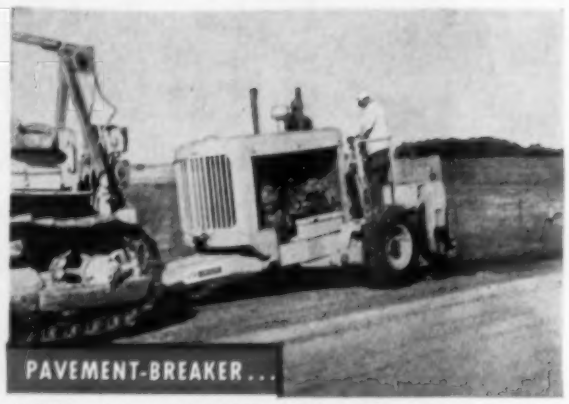
FRONT COVER ILLUSTRATION

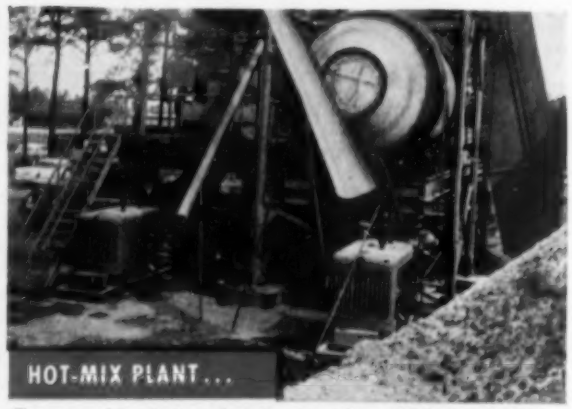
A General Motors diesel locomotive hauling a passenger train over some of the rugged terrain through which the Canadian Pacific Railroad travels. For economy and dependability, the CPR is going 100% diesel.

Choose your power from 18 work-proved INTERNATIONAL® UNITS!

Whether you specify engines for new machines, or are working up an optional engine program, there's an International power unit size that correctly fits your needs—be it for shovel, mix plant, grader, compressor, pump, paver, or crusher. Pick any of the 6 diesel, or 12 carbureted, LPG, and gas distillate units, 16.5 to 200 net hp. You'll get heavy-duty engines with the inbuilt tinker-freedom of positive temperature control, that features full-length water jackets. You'll get special-delivery pressure lubrication through drilled passages. You'll get wear-defiant, stress-resistant, induction-hardened crankshaft bearings. You'll get many other International stay-put, extra-value features. And, *your users* will get engines proved by popularity—more heavy-duty International engines have been sold over the last 50 years than any other make.

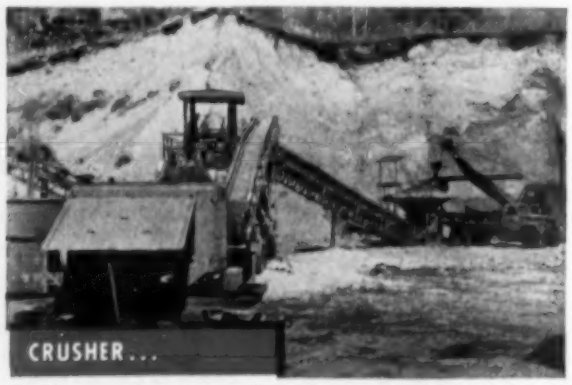


A 190 hp International UD-24 powers this preparizer which chews up 2 miles of 24-ft pavement per 8-hour day for G. A. Watson, Barneveld, Wis. Says Watson, "I buy International power whenever I can, because their engines are dependable and their field service excellent."



From a wide choice of optional engines, Nello L. Teer Co, Durham, N. C, chose 100% International power for their hot-mix plant . . . a 190 hp UD-24 on the tower, another UD-24 at the dryer, and a 125 hp UD-18A on the fan. Output averages 1,000 tons per 10-hour day.

City of Danville (Va) replaced original engines in their two ½ yd shovels with 75 hp UD-350's. "These International engines have sure cut our operating costs," reports Works Director H. F. Bowling. Each shovel now uses only 17 gallons of fuel to produce 95 five-yard truck loads per day.



For low maintenance crusher power, you can't beat International. This UD-24 has worked 12,000 hours in 7 seasons for Sheboygan County, Wis . . . has produced 700 tons per day . . . yet has needed only one overhaul. "Most dependable engine we know of," says the pit superintendent.

Our design engineers are well qualified to help you select the correct engine sizes and styles for your needs. Write us for details on torque curves and power characteristics.

International Harvester Company, Chicago 1, Illinois

INTERNATIONAL
INDUSTRIAL POWER

Now Warranted FOR 100,000 MILES

---or 1 year
---or 4,000 hours

Simple as ABC

— only three essential parts

A—Inertia mass or flywheel

B—High viscosity synthetic fluid

C—Sealed two-piece housing

— minimizes both major and minor critical orders of vibration

Patented in U. S. A. and foreign countries

The performance and dependability of the fully patented Houdaille Viscous Torsional Vibration Damper is well known to more than 25 makers of gasoline and diesel engines.

Since its introduction 10 years ago, it has been smoothing the performance and protecting the life of *millions* of engines.

Houdaille now backs this record with a 1-year, 100,000-mile, 4,000-hour Warranty (whichever occurs first) against defects in workmanship and material . . . the *first* of its kind in the industry.

Houdaille engineers will be glad to design a Viscous Torsional Vibration Damper to meet the individual characteristics of your engine, large or small.

HOUDAILLE INDUSTRIES, Inc.*

BUFFALO HYDRAULICS DIVISION | 537 East Delavan Avenue, Buffalo 11, N. Y.

**formerly Houdaille-Hershey Corporation*

"This piston tells the story of better lubrication with GULF DIESELMOTIVE OIL,"

says Mr. Oscar Voight, Chief Engineer of Baker-Whitely Towing Co., Baltimore, Md.

"I'VE never seen anything like Gulf Dieselmotive Oil for tugboat engine lubrication," says Mr. Voight. "When we pulled the pistons of the 'Columbia' after nine years of continuous service, they were barely worn. Rings were free and ports not clogged. Those pistons still had plenty of service left in them."

Gulf Dieselmotive Oil has proved time and again in scores of tug fleets that it has the quality to stand up and provide more effective protection for the powerful engines of these hard working boats.

Here's why:

1 Chosen for their ability to prevent hard carbon deposits in hot spots, the selected base stocks of Dieselmotive Oil also provide an oxidation resistance safety factor.

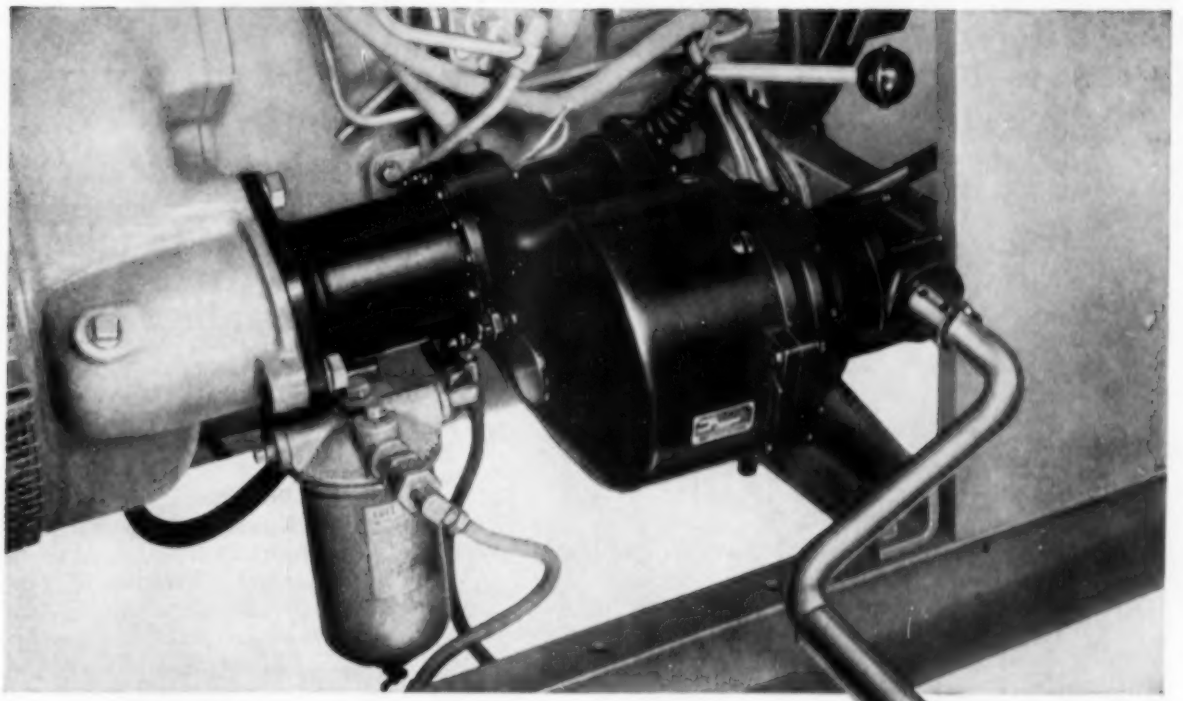
2 100% solvent refining of base stocks (which removes undesirable constituents) guarantees greater stability and more effective bearing protection.

3 Superior additive response is obtained by carefully matching the additives to the base stocks. This insures clean rings, grooves, oil cooling passages, and a minimum of piston crown deposits.

This combination of Dieselmotive qualities makes possible more hours of operation between ring jobs, and lower maintenance costs. Ask a Gulf Sales Engineer—experienced in Diesel engine operation—to recommend the proper grade of this outstanding lubricating oil for your Diesels. Contact him at your nearest Gulf office or write to Gulf Oil Corporation · Gulf Refining Company, 1822 Gulf Building, Pittsburgh 30, Pa.

GULF

THE FINEST PETROLEUM PRODUCTS FOR ALL YOUR NEEDS



For Diesel- and Ignition-Fired
MARINE AND INDUSTRIAL ENGINES...

Bendix* AE

HAND-CRANKED INERTIA STARTER

RUGGED, SIMPLE AND DEPENDABLE—This new hand-cranked inertia starter . . . available in four different models . . . is especially suited for use in remote areas and under difficult operating and climatic conditions.

Use the Bendix AE Inertia Starter where shock conditions can damage storage batteries or disrupt voltage regulation. Use it where battery maintenance is a problem or where there is a fire hazard. Replaces regular electric starter—no alterations to mounting flange needed.

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IDEAL FOR marine, mining, oilfield, agricultural and construction equipment installations and for standby engines.

Bendix INTERNATIONAL Product

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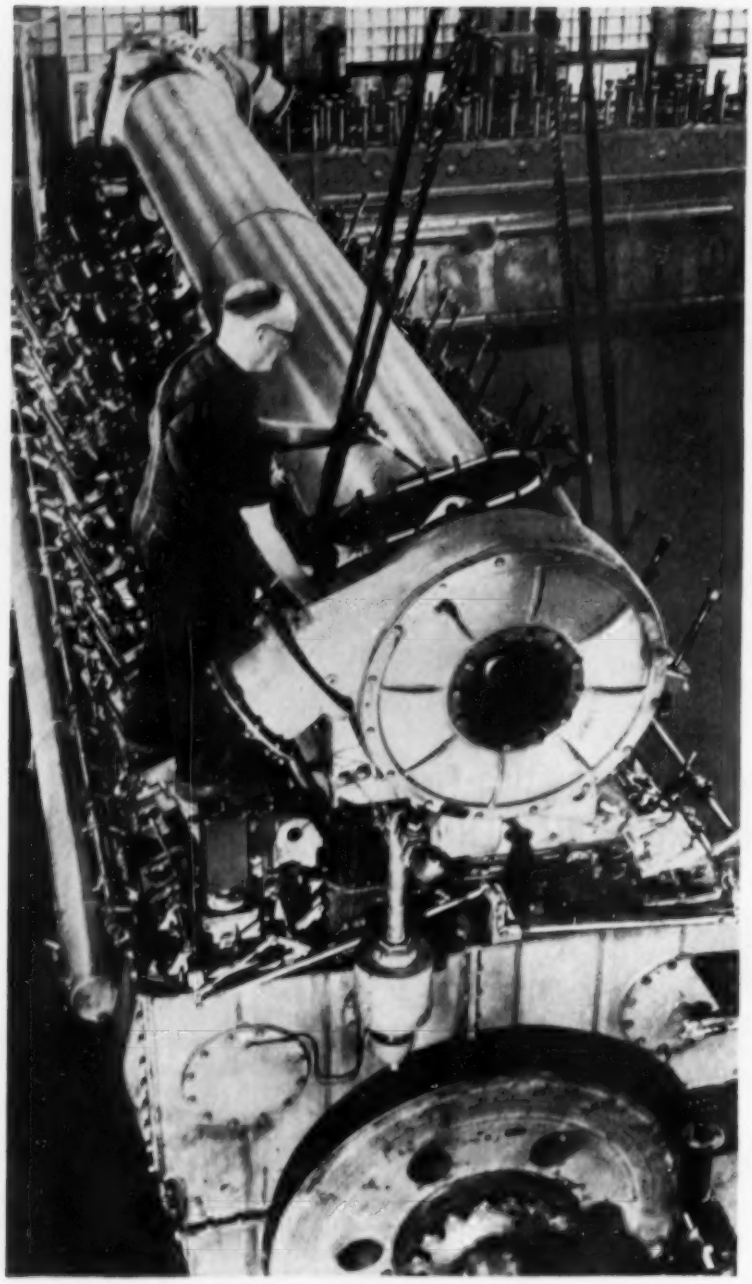


NOW...

America's first big diesel built to take full advantage of turbocharging

America's first diesel designed and built for turbocharged operation up to 5,000 hp has been hailed as the greatest power engine advance in over twenty years. Fourteen engines on order in its first production year prove unusual user acceptance. Some important reasons for this success are massive component design, compact construction for lower foundation and installation costs, and continuous high power operation on the most economical, locally available fuels.

Worthington's SW 14 offers you performance ratings that are conservative by *any* standard. You can only get this degree of reliability in a turbocharged engine when it's designed specifically for high cylinder pressures under continuous heavy duty operation. A "souped-up" engine just doesn't meet SW 14 standards.

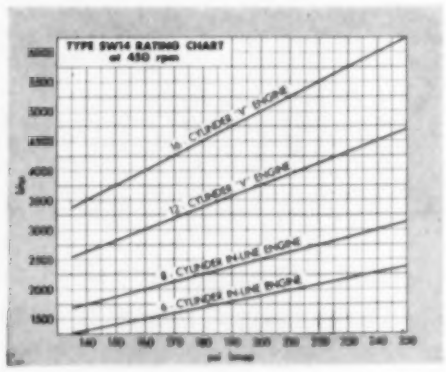
It's as easy as calling your nearest Worthington Office to get the whole story on the SW 14, or write Worthington Corporation, Section E61, Harrison, New Jersey, for Bulletin S-500-B60.

E61

WORTHINGTON

ECONOMICAL, CONTINUOUS POWER

Diesel, Dual-Fuel and Spark-Ignition Engines from 150 to 5000 BHP



The Engineer's Field Report

CASE HISTORY
LUBRICANT *RPM Delo Oils*
FIRM *Del Este Water Company, Modesto, Calif.*

Engine powers pump for 28,000 hours—sleeve wear is less than 0.002 inch!

PUMPING UP TO 2200 GALLONS OF WATER PER MINUTE, a 165 h.p. natural gas fueled Waukesha engine ran 24 hours a day for more than three years in the Del Este Water Company plant at Modesto, California. Driving a turbine pump, it worked against a constant head, with speed controlled to maintain a set pump discharge pressure. In spite of this tough service, RPM DELO Special Lubricating Oil kept engine in perfect operating condition right up to time of inspection. Oil consumption actually was less for the last 8000 hours service than for the first 8000. Inspection showed sleeve wear only 0.001 to 0.0015" with no taper; crankshaft "miked" within factory standards. As shown above, rings and grooves are clean, sleeves unscored. Same sleeves and pistons were reinstalled and engine went back into pumping service.

RPM DELO LUBRICATING OILS

FOR MORE INFORMATION about this or other petroleum products of any kind, or the name of your nearest distributor, write or call any of the companies listed below.

Why RPM DELO Oils prolong engine life

Special compounds stop corrosion

Anti-oxidant resists lacquer formation

Detergent keeps parts clean

Inhibitor resists foaming

Metal-adhesion qualities keep oil on parts in running or idle engines

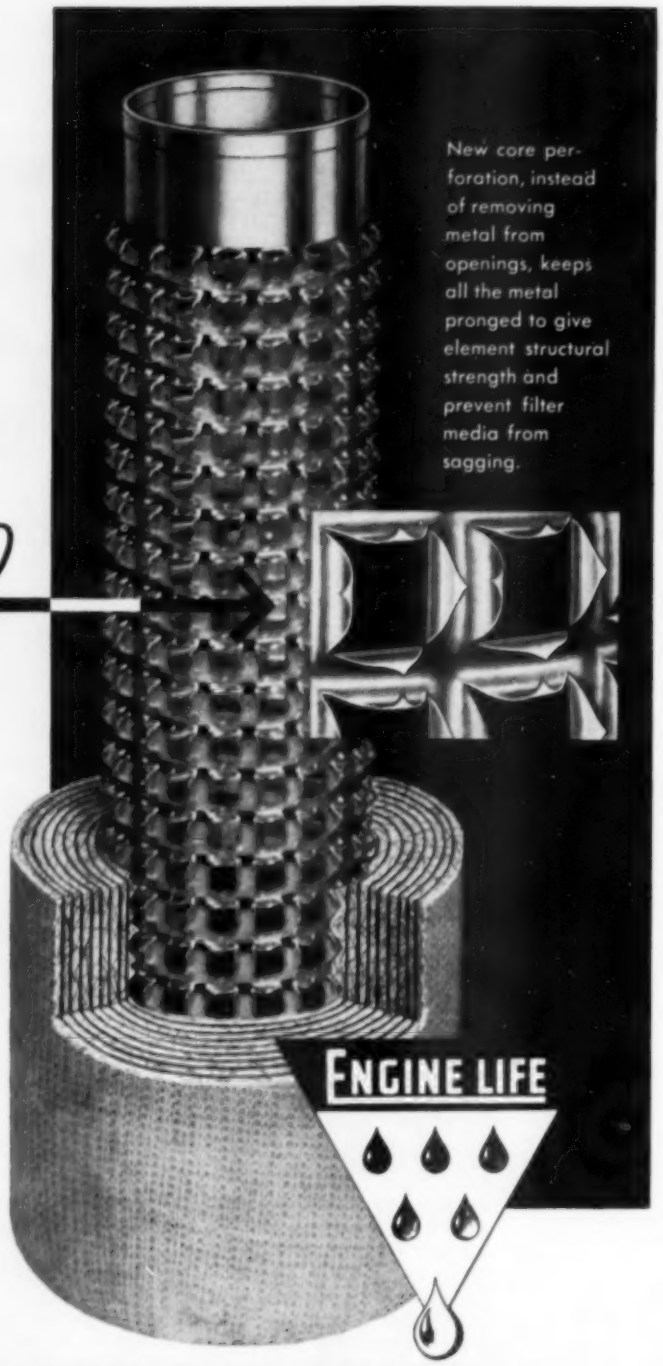
STANDARD OIL COMPANY OF CALIFORNIA, San Francisco 20 • STANDARD OIL COMPANY OF TEXAS, El Paso
THE CALIFORNIA OIL COMPANY, Perth Amboy, New Jersey • THE CALIFORNIA COMPANY, Denver 1, Colorado

A New Concept in *FULL-FLOW* Filters...

ENGINE LIFE *Maxiflo*

UNRESTRICTED CORE

DESIGNED TO GIVE
MAXIMUM FLOW
AND FILTRATION


New core perforation, instead of removing metal from openings, keeps all the metal pronged to give element structural strength and prevent filter media from sagging.
ENGINE LIFE

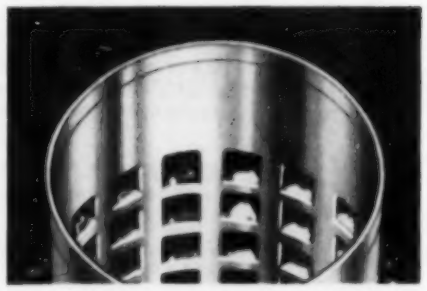
Conditions oil without restricting flow

Here's a brand new ENGINE LIFE exclusive that gives unrestricted oil flow without sacrificing strength. This new core development which required research and development of special machines and tooling right in our own plant, gives you the finest full flow oil filtering yet. Now, even the most viscous lubricating oils and fuels are filtered perfectly. Because core openings can handle up to 10 times the oil pumped through the system, the most excessive surges are easily handled, thereby protecting the hydraulic system from undue restriction and ultimate failure. All integral parts of the new Maxiflo core are of noncorrosive metal.

With Maxiflo, as in all Engine Life elements, consistency in diameter and length is maintained.

ENGINE LIFE elements operate without impairing the hydraulics of your engine. Better oil conditioning is achieved through the ENGINE LIFE absorption method of full filtration. All ENGINE LIFE elements are engineered to meet requirements of your application.

ENGINEERED FOR ALL REQUIREMENTS



Lubrication system flow rates are maintained by the free area ratio of perforation. Openings equal up to 10 times amount of oil volume pumped through engine.

Non-corrosive Metal Cores are end sealed with metal rings to insure trueness, add lip strength.

A COMPLETE LINE OF FILTERS AND REPLACEMENT ELEMENTS

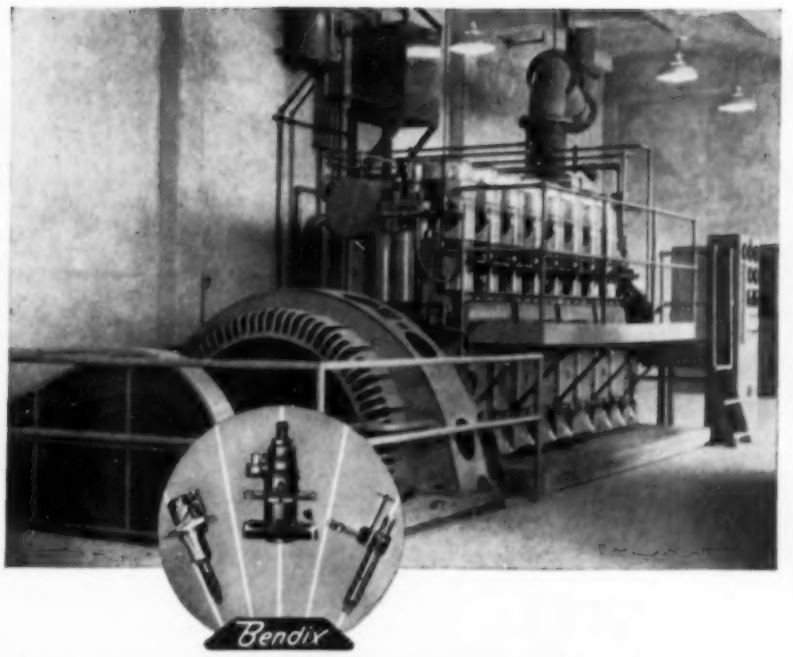
ENGINE LIFE *PRODUCTS CORPORATION*

EL MONTE, CALIFORNIA

Keeping San Francisco's new International
Airport ready for any power emergency . . .
SAN FRANCISCO INTERNATIONAL AIRPORT

ENTERPRISE 1000 KW DIESEL GENERATOR WITH

Bendix FUEL INJECTION EQUIPMENT!



Providing emergency power facilities for the vast, new San Francisco International Airport is no small task. Yet, the Enterprise Diesel Generator with Bendix* Fuel Injection Equipment, set for standby duty at this modern new airport, is prepared to quickly deliver ample emergency power.

As you can appreciate, specifications met by Enterprise engineers in making the installation were rigid.

First, within 15 seconds after any power failure, the Enterprise engine starts up and cuts in automatically on the landing light and runway light circuit. Then, in less than 15 minutes, full load is attained to power storm sewer, pumps, necessary emergency equipment, terminal, concourse and tower lighting. It was further required that the Bendix equipped power plant provide continuous full-load operation for weeks or even months without "shutdown". Actually, this mighty standby generator in prior tests not only met, but actually surpassed these rugged requirements.

Here, once again, is proof that when operating conditions demand unfailing dependability, Bendix Fuel Injection Equipment is the choice of leading diesel engine manufacturers.

*REG. U.S. PAT. OFF.

SCINTILLA DIVISION, BENDIX AVIATION CORPORATION
SIDNEY, NEW YORK

Export Sales and Service: Bendix International Division, 205 E. 42nd St., New York 17, N. Y.

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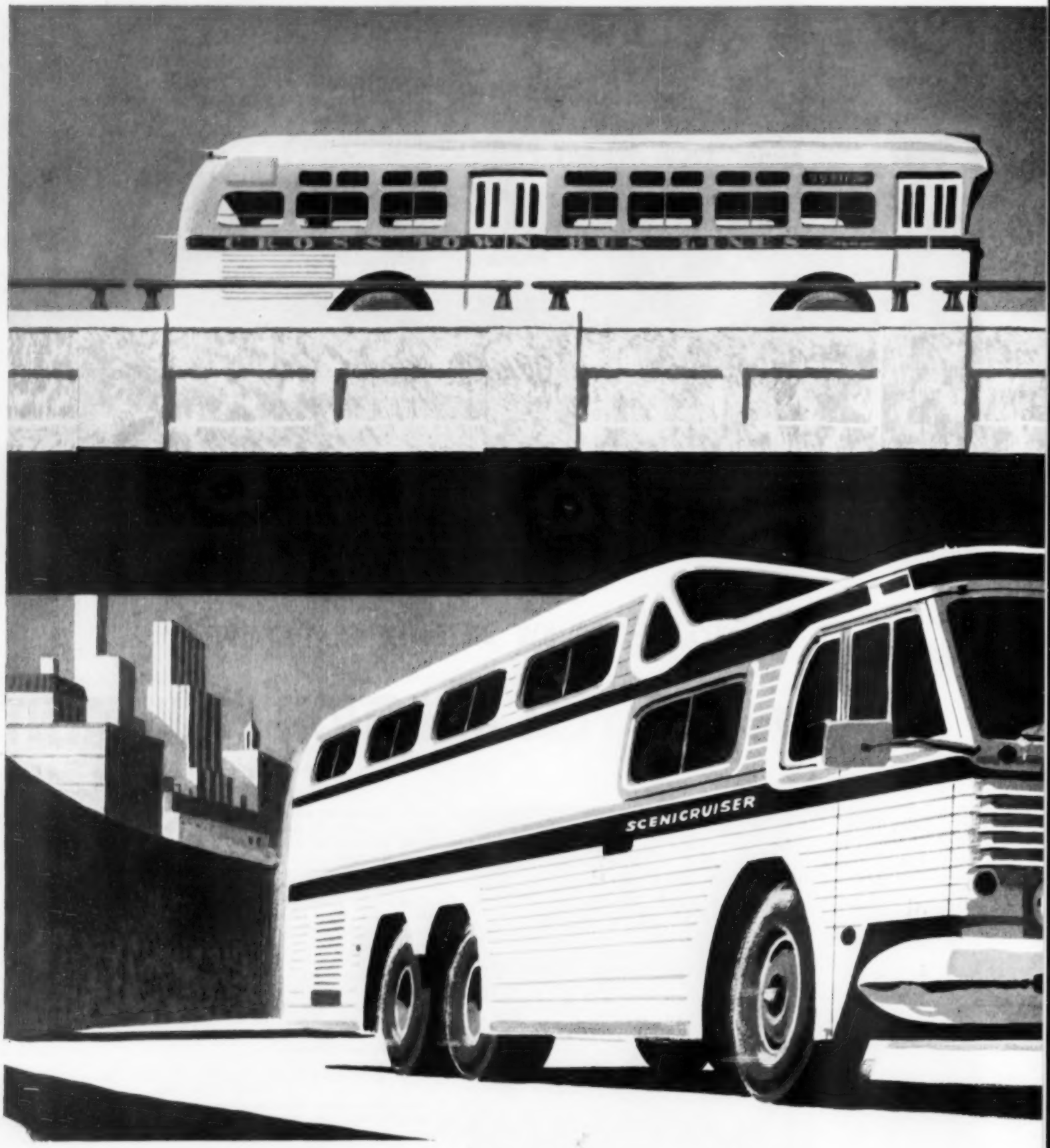


GM
GENERAL MOTORS

GENERAL MOTORS LEADS THE WAY—

You can get more earning hours

in passenger service with Delco-Remy heavy-duty electrical equipment

Delco-Remy's hard-working heavy-duty A.C. generators are tailor-made for dependable crosscountry or crosstown buses with extra-heavy electrical loads.

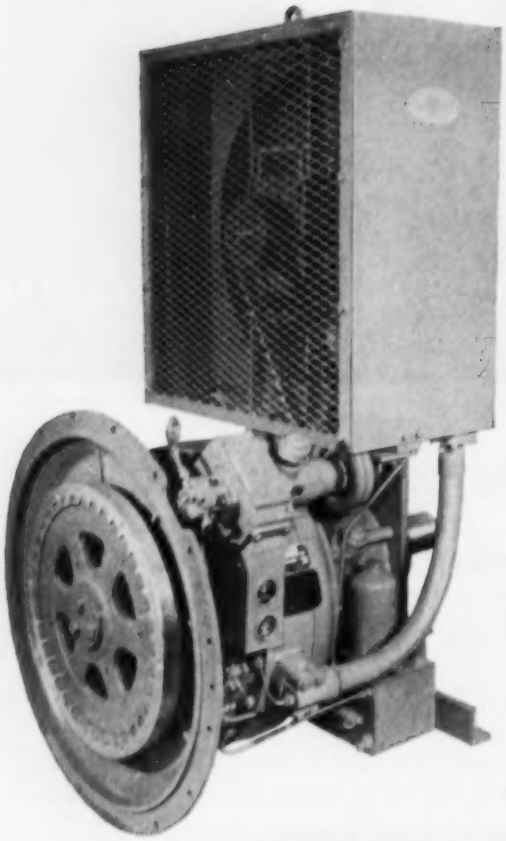
Desirable performance characteristics include cut-in at low generator rpm . . . maximum output of 180 amperes at low to medium speeds. With companion rectifiers and regulators these new generators can supply both alternating current for fluorescent lighting and direct current for the heaviest electrical loads coupled with lengthy engine-at-idle periods.

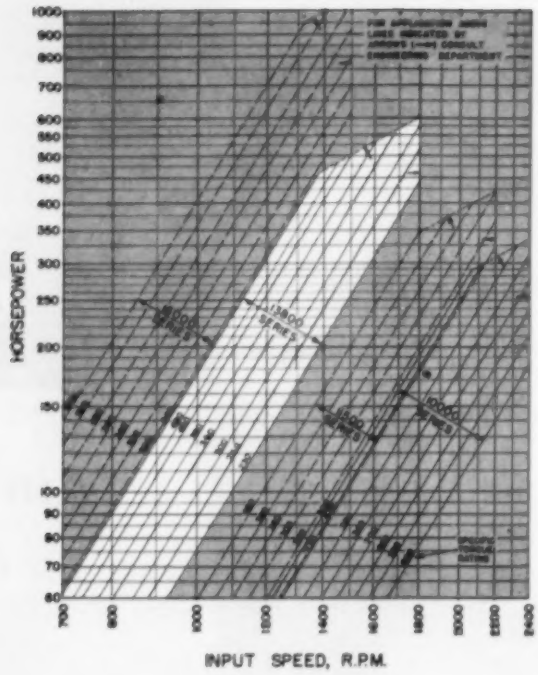
Impressive features of the new generators are their light weight, very high output capacity, and ability to operate over a wide speed range with greatest efficiency.

Delco-Remy also makes other heavy-duty electrical units, including the new longer life Delco batteries. Whether you're modernizing old vehicles or ordering new ones, be sure to specify Delco-Remy heavy-duty electrical equipment.

DELCO REMY • DIVISION OF GENERAL MOTORS • ANDERSON, INDIANA

VAY– TARTING WITH **Delco-Remy** ELECTRICAL SYSTEMS





ENGINE APPLICATIONS		
Eng. Mfg.—Model	Eng. Mfg.—Model	Eng. Mfg.—Model
Allis-Chalmers PC1879	Climax V-330	Mercedes Benz MB836 BG
Allis-Chalmers DC1879	Climax V-85	MGO V6S
Allis-Chalmers DSC 1879	Cummins LRH	MGO V12
Allis-Chalmers PCS 1879	Cummins NVHS	Murphy 24
Allis-Chalmers PC2505	Cummins VT 12	Murphy 122
Cat. D-342	Deutz BA8M517	Murphy 322
Cat. D-8	Fairbanks 38FS 1/4	Paxman VARPHW
Cat. D-364	Gardner 6-LO	Saurer —
Cat. D-9	Hall Scott V-12	Sterling V-06
Cat. D-375	LeRoi H-1500	Waukesha 880
Cat. D-386	LeRoi H-700	Waukesha 888
Climax R-61	M.A.N. 58V175/122 A	Waukesha 888S
Climax V-235	M.A.N. 6W175/122 A	Waukesha L80
	Mercedes Benz MB836-8	

ANNOUNCING . . . the new Twin Disc 13,800 Series Three-Stage Torque Converter

By W. B. Gibson, Sales Manager

Hydraulic Division, Twin Disc Clutch Company, Rockford, Illinois

With announcement of the new 13,800 Series, the Twin Disc Clutch Company *now* provides a three-stage torque converter for every horsepower range from 40 to 1,000—offering four distinct sizes, with a total of twenty-nine capacities, through internal blading variations.

Designed specifically to accommodate a large number of engines for which previous models were not ideally suited (see listing above)—this new series is planned around a *simple basic unit*—with easy-to-add components which produce ten specific models. This arrangement permits extreme flexibility and speedy interchange of components to provide a model specifically adapted to a wide variety of applications.

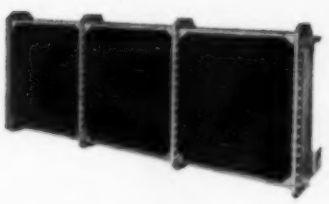
The 13,800 Series provides two *output* arrangements. There is *one standard output shaft assembly* designed for maximum side pull loads up to the full capacity of the converter. On this particular output shaft assembly, an output governor take-off is available. There is also *one standard output flange* designed for universal joint or flexible gear coupling drive.

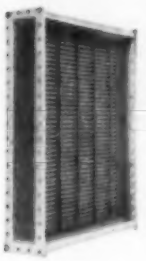
There are also three *input* arrangements—spider drive, incorporating a rubber block drive — which withstands normal misalignment conditions without imposing undue loads or stresses on the input shaft or the engine crankshaft; clutch assembly and independent mounting. In addition to being offered in ten different models, this new torque converter can be adapted, with appropriate engine speeds, to all engines in the 60 to 600 horsepower range by internal blading variations.

Get all the facts on the advantages of torque converter drive in equipment that *you're* planning or designing. Write *now*, to the Hydraulic Division, Rockford, Illinois.

Twin Disc Clutch Company
Racine, Wisconsin
Hydraulic Division, Rockford, Illinois

Cool trail for the Rocket!





TEMPERATURES MADE TO ORDER

ROCK ISLAND'S ultra-modern stream-liner cooled by **HARRISON!**

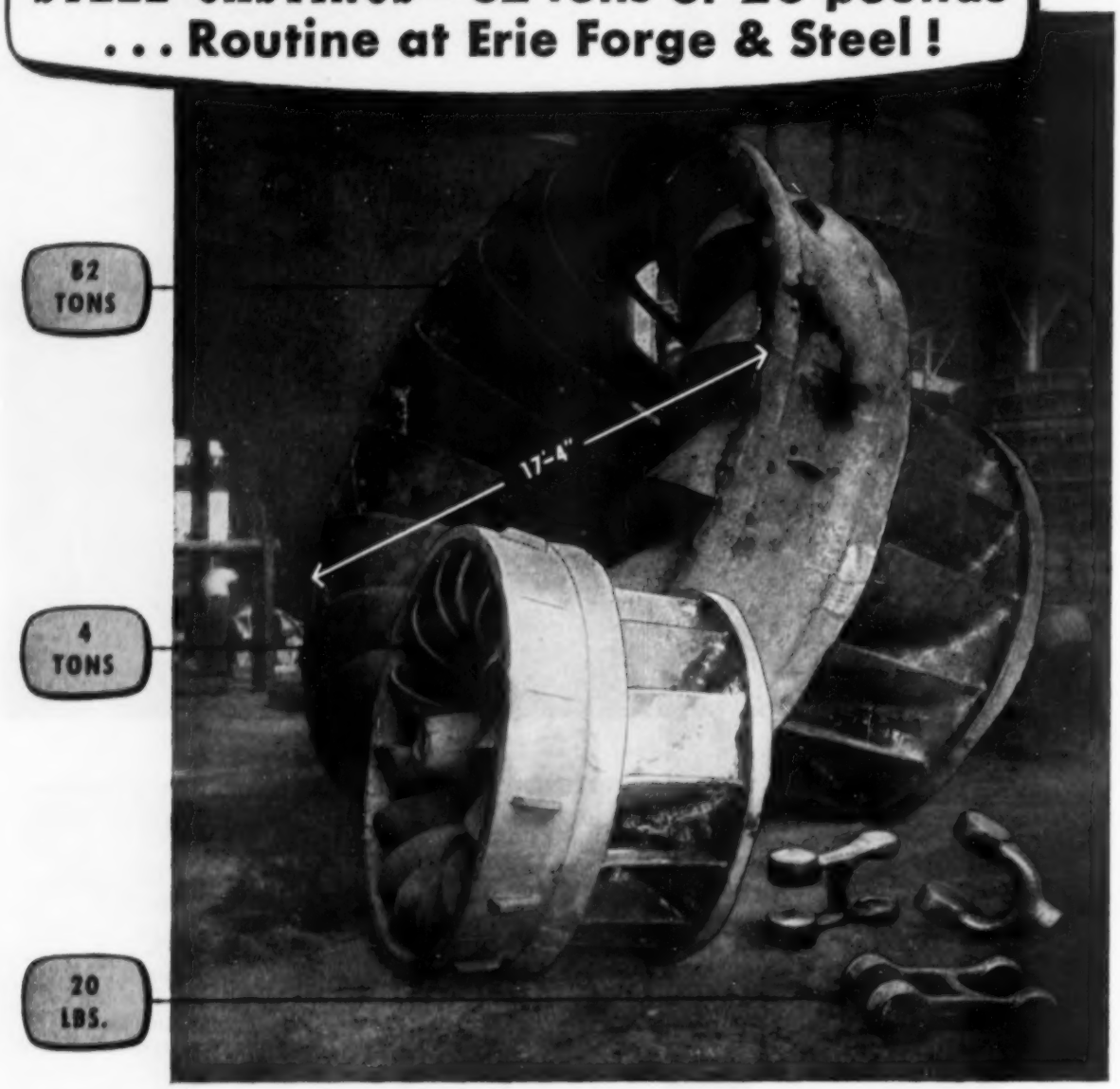
The Rocket's en route . . . and right on schedule! The Rock Island's famous streamliner blazes by village and town . . . racing with time . . . and on top of the heat *all the time.* For Harrison tracks down temperatures for the long haul. These heavy-duty lube oil and jacket water coolers keep heat down . . . keep engines running at peak performance. Harrison coolers are rugged, reliable and compact . . . ready for duty on today's most modern diesel engines. That's why Harrison heat exchangers ride the majority of modern locomotives today. If you have a cooling problem, look to Harrison for the answer.

HARRISON RADIATOR DIVISION, GENERAL MOTORS CORP., LOCKPORT, N. Y.

GM GENERAL MOTORS

HARRISON

STEEL CASTINGS - 82 tons or 20 pounds ... Routine at Erie Forge & Steel!



A LONG JUMP from "the largest steel water wheel ever cast in one piece", 82 tons of it, to a 20 lb. engine casting . . . Routine at Erie Forge & Steel. Here is definite proof of our versatile production capabilities. Engineers and metallurgists team up here with skilled craftsmen to control the production of steel castings and forgings from raw materials to finished product.

For example, engineering, metallurgy and production followed the 82 ton casting every step from raw materials to railroad spur to assure dimension and specification accuracy. "One responsibility and one control" is more than a slogan—here, it works for you.

ERIE FORGE & STEEL CORPORATION • ERIE, PENNSYLVANIA

MEMBER AMERICAN IRON AND STEEL INSTITUTE

ERIE FORGE & STEEL CORPORATION

"Trane is giving us the exact performance we specified!"

Trane Fluid Cooler engineers know actual field performance because Trane makes its own coils . . . and has been making them for 30 years.

That's why TRANE can say "Yes!" to your design requirements—*and deliver!*

TRANE has *field experience* covering virtually *all* types of coils and fans under *all* types of operating conditions—plus a tremendous backlog of supporting engineering design and laboratory test data.

That's why TRANE can more accurately tell horsepower consumption beforehand. And guarantee complete unit quality. TRANE *controls the coil's quality!*

Want the *complete* story on TRANE Fluid Coolers? Call your TRANE Sales Office or write TRANE, La Crosse, Wis.

FACTORY ALIGNMENT *of motor and gear box simplifies field installation, minimizes vibration—assures longer life! Complete drive unit shipped assembled.*

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MANUFACTURING ENGINEERS

One source, one responsibility for: Air Conditioning Heating • Ventilating • Heat Transfer Equipment

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SCHWITZER
TURBOCHARGERS

OVER ONE HUNDRED MILLION MILES OF PROVEN COMMERCIAL OPERATION

With 30 Years of Extensive Research and Production Experience in the Supercharging Field, Schwitzer Now Offers a Complete Line of 4 Sizes of Turbochargers For 50 to 1200 HP Installations. Now in Production in All Heavy Duty Fields—Truck-Tractor-Stationary-Marine.

SCHWITZER CORPORATION

INDIANAPOLIS, INDIANA

COMPRESSION RING . . . 1-piece, quick-seating. Maximum strength. Turned finish on outside diameter lets ring conform readily to the cylinder bore. The chemically treated surfaces aid rapid seating, no scuffing or scoring during run-in. ½" to 120" diameters.

POROUS CHROME PLATED RING . . . exclusive Van der Horst process. Shallow porosity on cylinder contacting surface facilitates break-in, holds and distributes oil during this critical period. Lasts four times longer, cuts cylinder wear up to 75%. ½" to 42" diameters.

CONFORMABLE OIL RING . . . maintains constant pressure for positive oil control. Conforms to meet cylinder distortion; flexible cast iron member, pressed outward by abutment type spring exerts uniform radial pressure around entire circumference. 4" to 25" diameters, ¼" min. width.

KOPPERS SEAL RING . . . has one or two projecting bands of bearing bronze inserted in contacting face. Very quick-seating. Tends to prevent blow-by in new or worn cylinders. The burnishing action of bronze on cylinder walls decreases scuffing and wear. 2" to 30" diameters.

GROOVED OIL CUTTER RING...valuable where oil control is a major problem. Two bevels for riding over oil on up-stroke, two scraping edges for removing excess oil from walls on downstroke, plus a series of wide drainage slots. 1½" to 25" diameters.

Five Koppers Rings . . . worth their weight in gold!

What will American Hammered Industrial Piston Rings *do for you?* They'll save you money on fuel, on lubricating oil, on labor costs—by reducing down-time.

They'll maintain high compression, improve your operation, give you *much* longer service. They don't cost much . . . but they have over 35 years of manufacturing skill and accumulated experience behind them. They never let you down, they never fail in the jobs they're designed to do—and hundreds of satisfied users will tell you that, despite their low cost, Koppers rings *are* worth their weight in gold.

American Hammered Piston Rings are available in all types, all sizes—from ½" to 10' diameter—for every purpose. Koppers makes American Hammered Rings for all kinds of industrial equipment, can recommend without bias as to types. It costs nothing to consult Koppers—for illustrated Piston Ring booklet write to KOPPERS COMPANY, INC., *Piston Ring & Seal Dept.,* 1404 Hamburg Street, Baltimore 3, Md.

METAL PRODUCTS DIVISION • KOPPERS COMPANY, INC. • Baltimore 3, Maryland
This Koppers Division also supplies industry with Fast's Couplings, Industrial Gas Cleaning Apparatus, Aeromaster Fans, Gas Apparatus.
Engineered Products Sold with Service

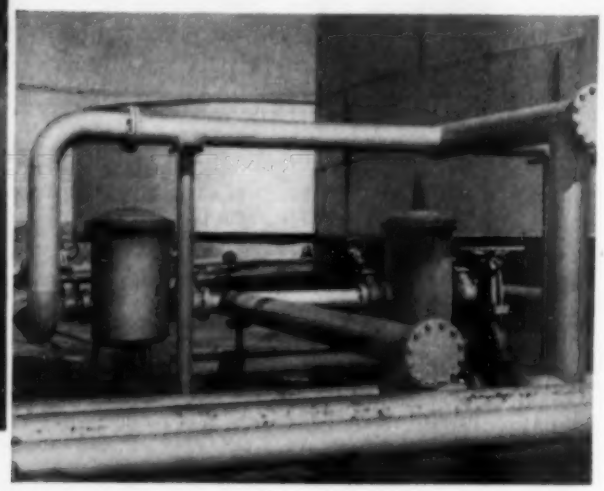
KOPPERS

AMERICAN HAMMERED
Industrial Piston Rings

at the curb new Purolator dual fuel filter, PAG-25D, has a high flow rate of 25 GPM for diesel fuel combined with virtually no pressure drop. A final assurance to every customer that your product is clean.

or

at the terminal large bulk filtration equipment like this pedestal-type filter (PAG-300L to 1200L) can be used at high flow rates of from 300 to 1200 GPM. Reduces meter wear.



Purolator micronic® fuel filters remove rust

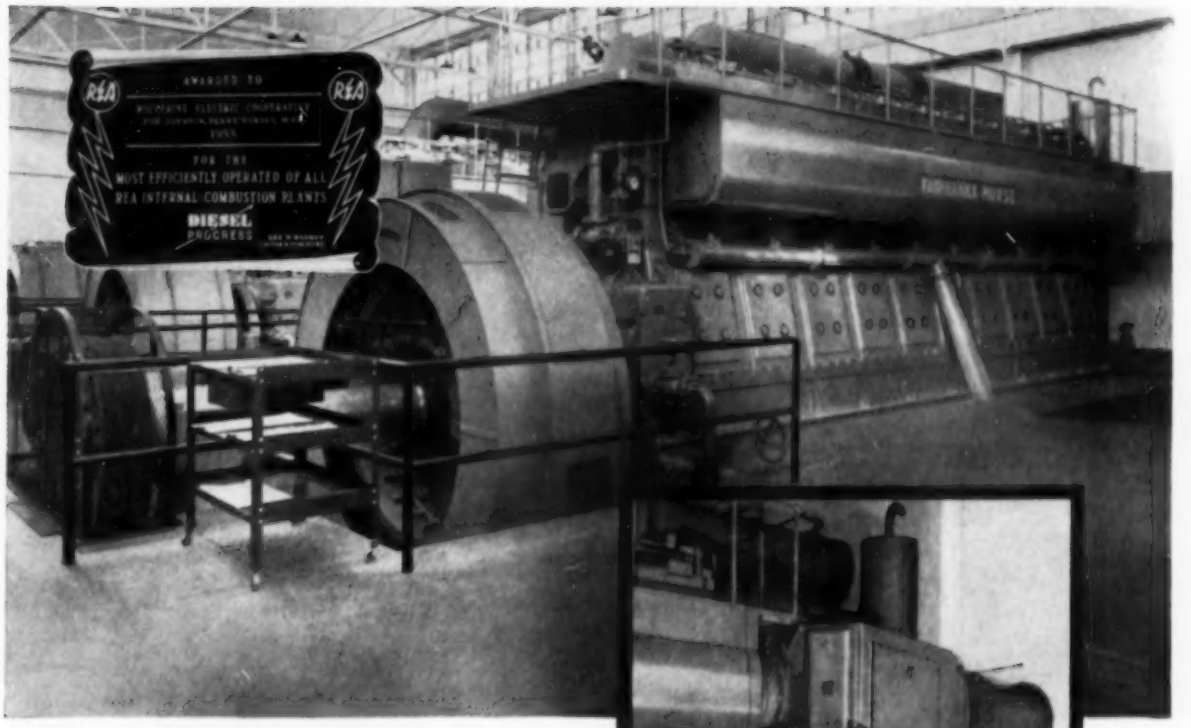
Despite rigid checks which prove the purity of fuel as it leaves the refinery, subsequent corrosion in storage tanks and pipes frequently contaminates it with particles of iron oxide. To remove rust particles, Purolator's engineers have developed the world's finest line of bulk filtration equipment. A recent addition to this line is Purolator's new curb pump filter. It has a filtration area of over 1800 square inches, achieved by 2 resin impregnated micronic fuel filters operating in parallel. Its development helps make certain that wherever you filter diesel fuel or gasoline ...at the curb or at the terminal...you can get precisely the right filter from Purolator.

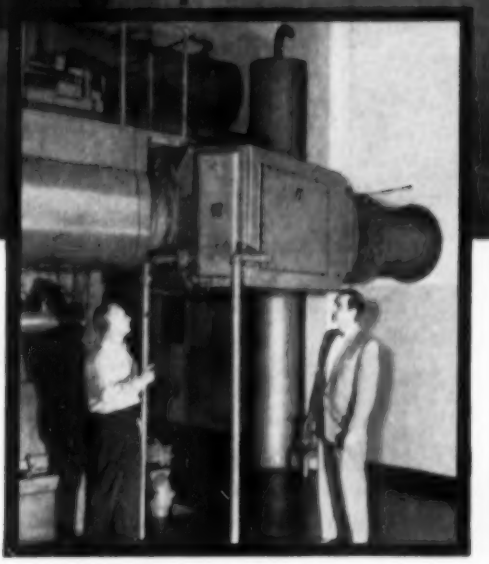
PUROLATOR

"FIRST IN THE FIELD OF FILTERING"

For full details, write
Purolator Products, Inc.,
970 New Brunswick Ave.,
Rahway, N. J., Dept. B3-410

PUROLATOR PRODUCTS, INC., Rahway, N. J., and Toronto, Ontario, Canada





One of three Ross Scavenging Air Coolers serving F-M Engines at Johnson Plant.

ROSS EXCHANGERS

teamed with

F-M DIESELS

give Wolverine third victory in REA contest

Three wins in four starts... that's the record of the Wolverine Electric Co-operative's Johnson Plant at Hersey, Michigan, which again received the Efficiency Award for "the nation's best operated internal combustion REA plant of the year."

Employing 3 Fairbanks-Morse dual fuel Diesel engines, each equipped with a Ross Scavenging Air Cooler, Oil Cooler and Jacket Water Cooler, Wolverine achieved the lowest operating cost per kilowatt-hour of all of the competing plants. Temperatures are held within the prescribed limits, assuring safe, dependable engine operation.

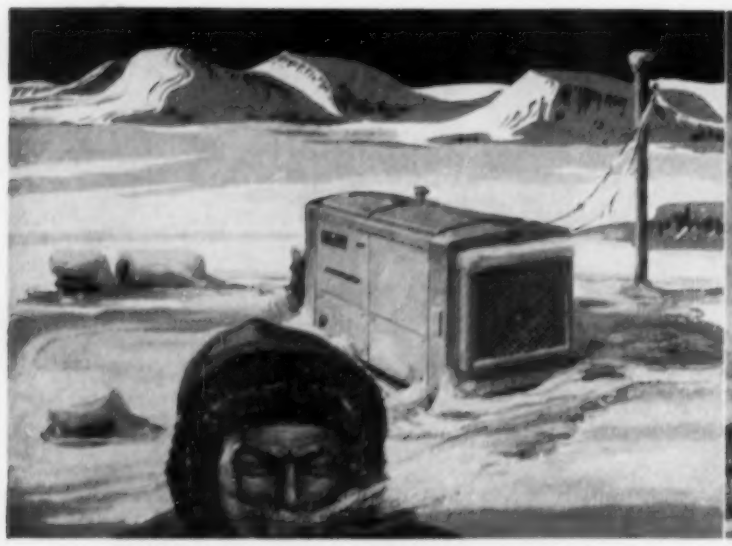
Whatever the job, cooling... heating... condensing, Ross Exchangers are widely preferred for their high thermal efficiency and extreme ruggedness. Practically all engine manufacturers specify these compact units as standard equipment.

Ross Exchangers are fully standardized and pre-engineered in a broad range of sizes to meet every requirement.

For detailed information write Ross Heat Exchanger Division of American-Standard, 1425 West Avenue, Buffalo 13, New York. In Canada: Kewanee-Ross of Canada Limited, Toronto 5, Ont.

ROSS

EXCHANGERS



TEMPERATURE EXTREMES — Hundreds of Stewart & Stevenson Diesel-powered generator sets are operating inside the Arctic Circle where temperatures drop below — 70° F. and in the South Pacific where temperatures exceed + 120° F.

SEVERE DUST — Stewart & Stevenson-supplied drilling engines and pumping engines have been operating successfully for years not only in some of the worst parts of the "Dust Bowl" but also in Desert Regions of the Middle East.

What is your

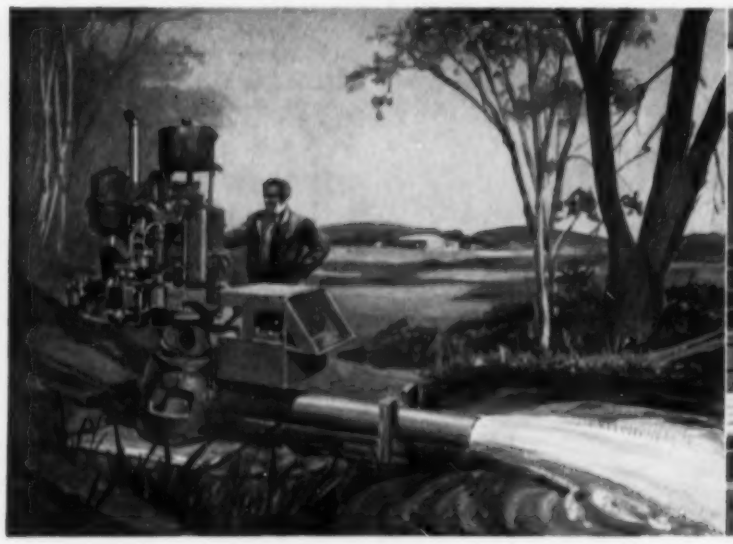
Why experiment with unfamiliar power problems – when you can take full advantage of the experience and know-how of the Nation's Largest Distributor of Diesel Engines?

The correct selection of an engine or generator set can be a tricky problem if it is not based on sound and practical experience rather than theory.

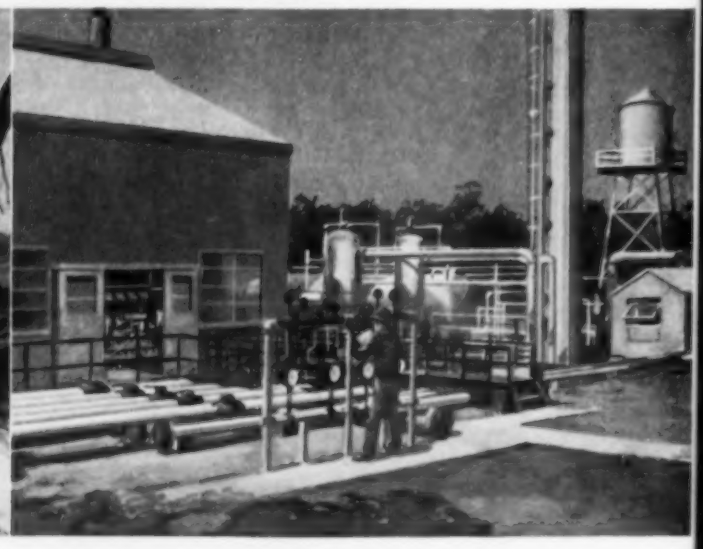
When you face an application problem, don't experiment when you can be sure! Besides the advantages of practical application knowledge, Stewart & Stevenson equipment usually costs far less in the final analysis than most other equipment.

You don't take chances when you deal with Stewart & Stevenson. There is **one** source and **one** responsibility for all your power requirements. Call us and let our experience keep you out of trouble.

CRAMPED QUARTERS — Stewart & Stevenson engineers have frequently found ways to install more powerful engines in cramped engine rooms as well as other applications where space conservation is of prime importance. This Stewart & Stevenson "Vertical" application of the General Motors Diesel is a typical example of how Stewart & Stevenson ingenuity saved space, increased efficiency and in addition actually cost less to buy.



EXPLOSION HAZARDS — Successful Stewart & Stevenson engine installations have been made in hazardous areas around refineries and gas processing plants. Stewart & Stevenson engineers are thoroughly familiar with explosion and vapor-proofing in the design of switchgear and other electrical components.



MARINE PROBLEMS — For years, Stewart & Stevenson has been dealing with the corrosive and troublesome aspects of sea water, supplying engines and generator sets for offshore service boats, fishing boats, tugs, and other craft working in the waters of the Gulf Coast.

HIGH ALTITUDES — Stewart & Stevenson drilling engines and generator sets are operating successfully at altitudes in excess of 12,000 feet in the Rocky Mountain Area as well as other remote locations throughout the world.

power problem?

STEWART & STEVENSON

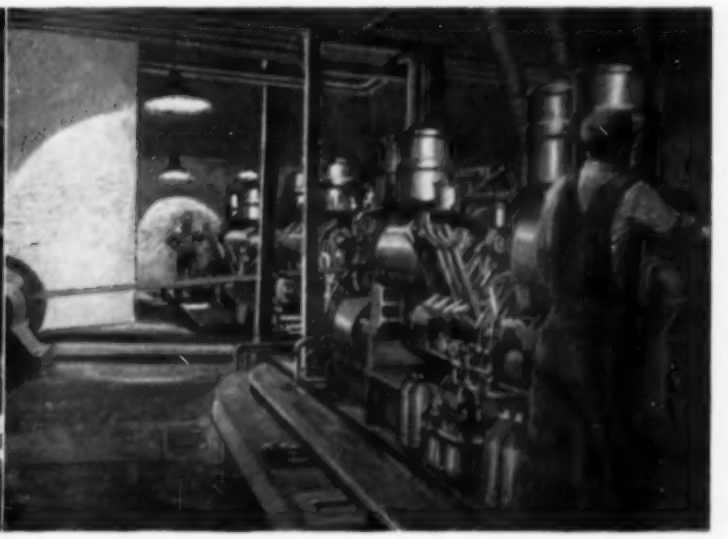
STEWART & STEVENSON SERVICES, Inc.

Main Office and Plant: 4516 Harrisburg Blvd., Houston 11, Texas. Phone CApitol 5-5341
Branches: Corpus Christi, Dallas, Lubbock, San Juan, Odessa.
Representatives: San Antonio, Longview, Brownsville, Tyler, Pecos.
Distributors of: General Motors Diesel Engines, Climax Blue Streak Engines, Chrysler Industrial and Marine Engines, Potter Diesel Engines.
Manufacturers of: Electric Power Units, Electrical Control Equipment, Portable Pumping Units, Red Head Pumps.
Export Office: Room 1405, 74 Trinity Place, New York, N. Y. Phone Digby 4-6658.

THE NATION'S LARGEST DISTRIBUTORS OF GM DIESEL ENGINES

ELECTRICAL DESIGN — Stewart & Stevenson has sold more Diesel generator sets in more different types of applications than any other distributor of Diesel engines in the nation. Units are operating in temperatures that range from — 70° F. to + 130° F. and at altitudes that range up to 12,000 feet.

FUEL SELECTION — Complicated fuel conditions are no problem to Stewart & Stevenson engineers. The line of engines offered by Stewart & Stevenson cover all types of fuels such as butane, natural gas or diesel fuel and Stewart & Stevenson's experience in burning inferior types of fuels such as heavy crudes has been extensive.



Inland River Reports

By A. D. Burroughs

INTENSIVE inland river interest has been focused upon the 37th annual convention of the Mississippi Valley Association held in early February at St. Louis, where Marvin B. Marsh was elected the new president.

FAIRBANKS-MORSE, Caterpillar, The Texas Company, Wartenbe Filters, Cooper-Bessemer, Socony Mobile Oil, Morse Instrument Company, and the Sinclair Refining Company were among these represented with excellent displays at the MVA Convention.

THE FINANCING for the construction of a planned 600 hp. towboat, 65 x 24 with a draft of 4½ feet to meet the Missouri River needs as agreed by representatives of the Sioux City Industrial Council and the Upper Missouri River Corporation will make possible the first major waterway service for Sioux City since early pioneer days. Engine selection has not been made as yet, for this craft to be built by the Upper Missouri River Corporation.

TWO MODEL 12-567-a GM (Cleveland) engines will power the new 132 x 34 x 11 vessel now under construction at Alexander Shipyard, New Orleans. Still un-named, this craft is one of three 1800 hp. towboats ordered by Commercial Transport Corporation, Houston.

THE FINISHING TOUCHES are being put on the new 1600 hp. towboat at the Calumet Shipyard and Dry Dock Company, Chicago, for the Material Service Corporation. Measuring 110 x 30 x 10.8, this new one is equipped with Nordberg engines.

THE *ARAPAHO*, equipped with two GM (Detroit) engines, Model 6-110 has been completed at Missouri Valley Steel, Inc., Leavenworth, Kansas for the Western Contracting Corporation, Sioux City, Iowa. Designed to tend the dredge *Western Chief*, this vessel is a split hull type boat that can be shipped by rail to the point of water service.

BUDA ENGINES supply both main propulsion and auxiliary power for the two twin vessels, *Offshore Service* and *Gulf Service*. Measuring 135 x 32 each, these twins were completed by the Ingalls Shipbuilding Corporation, Miss., and were launched and christened in what is reported to be the first joint launching of its kind in inland river history.

OTHER IMPORTANT NEWS from Ingalls Shipyards included the order placed by the U. S. Government for the construction of two destroyers at the cost of $32,450,000.

MARCH 1ST was the scheduled delivery date for the twin-screw towboat for the Kanawha Sand Company from the Barbour Metal Works. The boat is not yet named, but is powered by two GM (Detroit) model 110 engines, and will earn its reputation in the sand and gravel traffic.

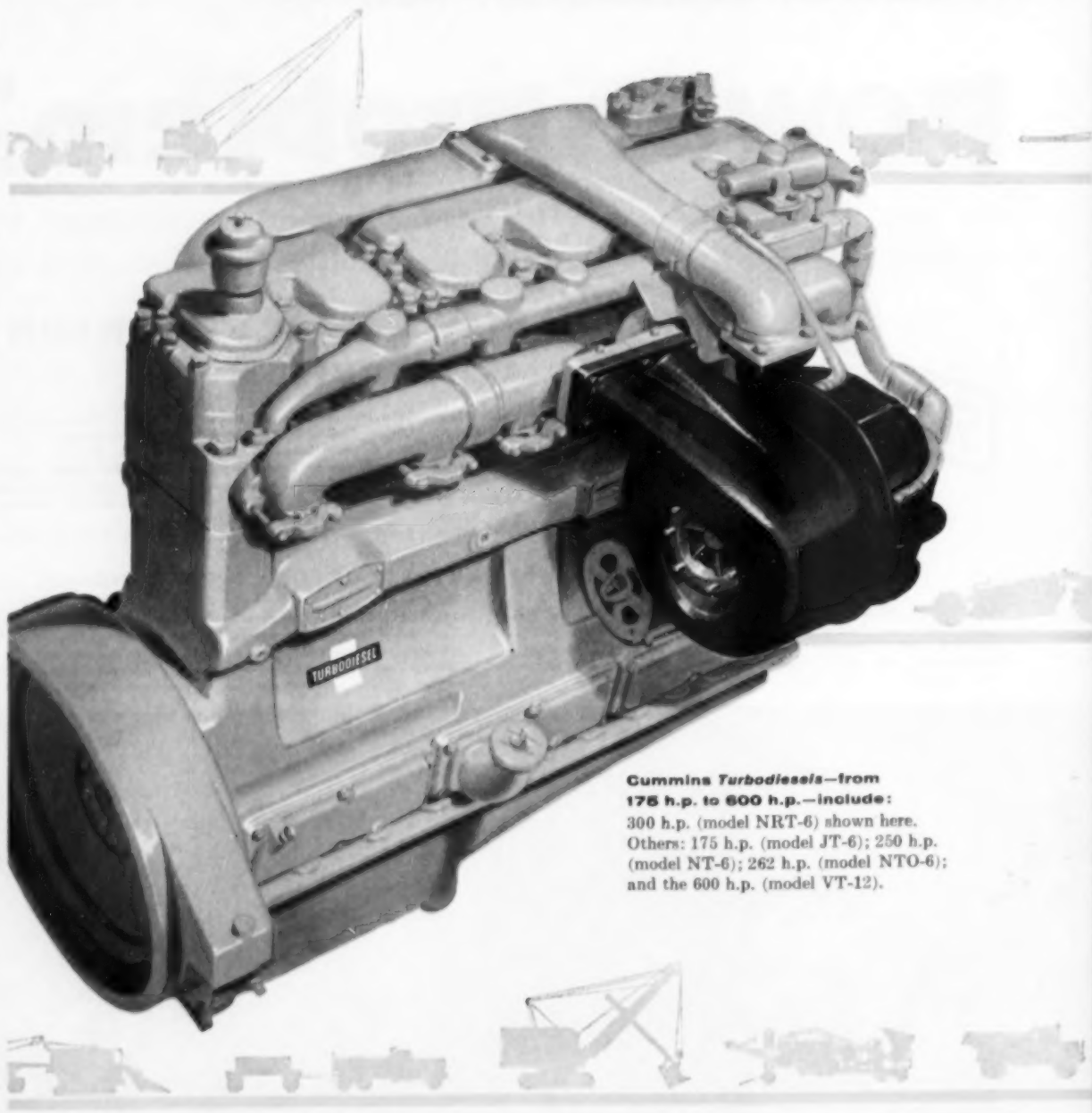
ANOTHER NEW VESSEL, the *Jean Frances*, owned by the LaFourche Towing Company, Gallion, La., made its initial trip out up to Chicago, with good success from her two 500 hp Caterpillar engines. Measuring 65 x 20, she weighs 65 tons.

A 2400 HP twin-screw diesel towboat for stock purposes is on the construction docket at Brownsville, Pa., the Hillman Barge and Construction Co. Scheduled to measure 150 x 34 x 10 ft. 6 in., the present reports leave engine decision tentative.

ENTERPRISE ENGINES provided the fine power performance given by one of

now available...from 175 h.p. to 600 h.p.

A COMPLETE LINE OF



Cummins *Turbodiesels*—from 175 h.p. to 600 h.p.—include:
300 h.p. (model NRT-6) shown here.
Others: 175 h.p. (model JT-6); 250 h.p. (model NT-6); 262 h.p. (model NTO-6); and the 600 h.p. (model VT-12).

our favorites, the *Reba-Jane*, owned by Thomas Petroleum Transit, Inc., as this 1700 hp boat was upbound on the Ohio with a 720-foot oil tow, including 60,000 barrels, making good time upstream, with this tow!

THE *JOHN E. COON*, a popular triple-screw 700 hp with the 4½ ft. draft now owned by Baton Rouge Coal and Towing Company played a role in inland river history, using the power from three Caterpillar engines to move the first liquid sulphur barges up the Ouachita River, (Arkansas).

BETTER WEATHER, despite high pool stages, saw an increase of river activity on the Upper Ohio, noting the *Sugar*, normally seen in southern waters. A 900 hp Arkansas vessel, built in 1944, she is powered by Caterpillar D397 engines which were placed in 1952. She is owned by the Anoka Towing Co., Arkansas.

THE SAND AND GRAVEL trade on the upper Ohio found the *Buckeye*, another Dravo product of 1945, in action for Keystone, using the 760 hp from the Cooper-Bessemer engines. This one is a sister vessel to the well-known *Keystone*.

ANOTHER frequently reported boat during the past weeks is the nine-year-old *Pennsylvania*, owned by Union Barge, built by Dravo. Its 200 hp comes from Superior engines. Kort nozzles give the craft more than 2800 hp.

STEEL CITY, powered by Nelseco engines for a total 600 hp., was active in the coal trade in that area. Many folks remember this one as the *Mary Alice*, built by Dravo in 1929.

CUMMINS *TURBODIESELS!*

POWER!.....PERFORMANCE!.....PROFIT!

Here's a new power concept to make *your* construction jobs more profitable. Cummins Turbocharging brings you extra diesel horsepower by harnessing the energy in normally wasted exhaust gases . . . boosting engine efficiency.

Turbodiesel performance on all kinds of construction jobs show significant savings in time, fuel and equipment. And, like all Cummins Diesels, the new *Turbodiesels* feature the simple-to-understand-and-service PT fuel system and easy-as-gasoline maintenance. Added time-saving economy feature: Cummins nationwide distributor system makes sure that factory-type service and genuine Cummins parts are always near *your* operation.

No wonder *more and more construction men today are standardizing on Cummins Diesels.*

CUMMINS gives you the big plus **MORE PROFIT**

Get more information! Mail this coupon today!

Cummins Engine Company, Inc.
Columbus, Indiana

___ Send me a copy of the booklet "More Profit with Cummins *Turbodiesels.*"

___ Send me a copy of the "Cummins Who's Who"—directory of manufacturers furnishing Cummins power in their equipment.

___ Have a Cummins representative call on me with *Turbodiesel* information.

Name_____

Company_____

Address_____

City_____ Zone____ State____

Eliminates Hard Starting

The Kent-Moore Organization, Inc., leading manufacturers of Rate-Maker special service tools and equipment, has just released a new fuel system primer for diesel engines, the J 5956. The primer is applicable to GM Detroit Diesel engines, Buda diesel engines, and others.

Particularly valuable after engine or head overhauls as an engine starting aid, this new primer insures a fuel supply throughout the fuel system before starting. Use of the primer eliminates danger of damage to fuel injectors, fuel injection pumps, and nozzles caused by attempts to start without an adequate fuel supply throughout the fuel system. Also reduces wear and tear on the starting system, especially during cold weather.

The J 5956 Primer tank holds approximately one quart of fuel and is equipped with a filter. Designed for easy attachment from any position, the J 5956 is simple to disassemble for cleaning of the tank and pump components.

For further information write the Kent-Moore Organization, Inc., 1501 South Jackson St., Jackson, Mich. (ITS NEW)

Improved Starting Systems

Quick, easy starting on cold winter mornings is assured with the improved direct electric starting systems just announced by Caterpillar Tractor Co. as attachments for D6, D4 and D2 Tractors and No. 977, No. 955 and No. 933 Traxcavators. Each of the 24-volt systems now includes as standard equipment two ether starting aids and the necessary tubing to inject vaporized ether into the air intake manifold.

The use of the ether starting aids in conjunction with the glow plugs which have been successfully used in Caterpillar direct electric starting system for some time makes it possible to start the units without difficulty in freezing temperature as low as 10°F. (ITS NEW)

Straws in The Business News

FORECASTS OF SALES of dieselized farm, construction and other equipment continues to indicate an upward trend. This, despite the fact that there has been some cutbacks in farm equipment production. This follows record output of previous years. The cutbacks are in part an effort to permit dealer inventories to drop, and impelled by the drop in farmer income. Oliver, Minneapolis-Moline, International Harvester and Allis-Chalmers have all been affected. I-H's president, John L. MaCaffrey, sees no reason why earnings for 1956 should fall behind that of 1955. All I-H products continue to show a high level of sales. With the Canadian market expanding, total production should go up.

CATERPILLAR'S SALES for 1956, it is predicted, will rise over that of 1955, according to a report to stockholders. The export demand will increase. The firm placed more new models into production last year than in any other previous year. . . . . The sales and earnings of Clark Equipment Co. hit new highs in earnings last year and president George Spatta sees another banner year for 1956. . . . . Fairbanks-Morse Co. reports that earnings rose during 1955 despite stiff competition in some of its lines.

MORSE CHAIN CO., a subsidiary of Borg-Warner Corp., has acquired Eberhardt-Denver Co. and its affiliate Spreco Co. The newly acquired organization manufactures a line of worm gear speed reducers, double-reduction helical gear speed reducers, screw conveyor drives and gear motors. The addition will enable Morse Chain to expand its market potential. . . . . Byron-Jackson Division of Borg Warner, has begun construction of a new 65,000 sq. ft. plant at Santa Ana, Calif. . . . . Another indication of the trend of the times came to public notice when Baldwin-Lima-Hamilton announced the sale of seven buildings at Eddystone, Pa. The building was formerly used for the construction of steam locomotives . . . . . The Muskegon Piston Ring Co. has merged with Rotary Seal Co. of Chicago. Rotary seal manufactures shaft seals.

DIESELS CONTINUE TO GROW in railroad use. L & N plans on buying more than 50 dieselized units with delivery by April 1957. Alco-GE will provide 28 freight units and EMD will supply four switchers and 24 freight units. . . . . Virginian Railway ordered eight more diesel-electrics from Fairbanks-Morse. The road expects to pay for them from its own resources without financing. . . . . The Talgo-type Rock Island "Jet Rocket" has made its debut in a run from Peoria to Chicago. It is EMD powered as is the GM Aerotrain, which the Pennsy recently placed into service. . . . The Santa Fe has begun experimental tests of the Aerotrain before regular passenger service is placed into effect. . . . Norfolk and Western has ordered 50 general purpose locomotives to be built by EMD and Alco Products. Cost of the new equipment will be about $9.3 million.

THE MANAGING director of the Associated General Contractors of America, H. E. Foreman, predicted at the association's annual convention in New York that the construction industry will probably break records for the 11th straight year. . . . Highway building for the coming ten years should be considerably increased and accelerated according to the Committee For Economic Development, a non-profit organization of business men.

CALIFORNIA STANDARD OIL has revealed plans to spend a record sum for expanding refineries, improving marketing and exploration and development. . .

Transcontinental Gas Pipe Line Corp., has applied for a better than $38 million expansion of its line from Texas to New York City. . . . Texas Company is considering construction of a refinery in the Pacific Northwest. Sites are being studied. . . . . Coastal Transmission Corp. has filed an application to build and operate a $60 million gas pipe line from lower Rio Grande Valley to Baton Rouge, La. It is part of a plan to ultimately deliver natural gas to Florida.

THE INSTRUMENT SOCIETY OF AMERICA'S International Automation Show will take place in New York City during September. More than 30,000 executives, engineers, scientists and technicians are expected to attend. . . . . Nine authorities in design engineering will lead four days of discussions at the Design Engineering Conference of the ASME to be held at Convention Hall in Philadelphia, Pa.

To Set Up Distributor Organization

This spring Merlin Engineering Co., Ltd., of England will, for the first time, set up a U.S. distributor organization to sell and service diesel repair machines in this country. While Merlin's equipment is well known here, up until the present purchasers have had to buy directly from England or through the Canadian distributor.

Merlin will demonstrate its "Servicemaster," and "Calimaster" and "Comparator" at a show for interested distributors starting April 9th at the C. A. Auffmordt & Co. showrooms, in New York City. The "Servicemaster," a versatile and high precision grinder, reconditions fuel injector nozzles and needles. The "Calimaster," offered in two sizes and with several optional attachments, calibrates fuel injection pumps. The "Comparator" tests all sizes of pump elements. For further information write C. A. Auffmondt & Co., 468 4th Avenue, N. Y., New York.

To Provide 318 Buses

Mack Trucks, Inc., will supply 318 diesel buses to New York City's Transit Authority in a major modernization of the city's surface transportation facilities. The last previous bus purchase by city transit authorities was in June, 1950, when it bought 140 Mack buses.

P. O. Peterson, Mack president, said production schedules are being set up immediately at the Mack plants here and in Allentown, Pa., to speed delivery of the new vehicles. Under Mack's contract with the Transit Authority, 18 buses are to be delivered within four months. Thereafter 75 buses will be delivered each month for four months.

Powered by Mack Thermodyne diesel engines, the buses also feature hydraulic torque converters and airglide suspension to provide maximum riding comfort. Forty-four of the new vehicles will replace 40 trolley cars on two routes in Brooklyn. A fleet of 175 vehicles dating back to 1947 and 1948 will be replaced by 158 of the new buses which also have larger seating capacities. Another 116 will replace 116 gasoline buses now in operation on Staten Island.

Name Change

Florida Diesel Engine Sales, Detroit Diesel Engine Division, General Motors Corp., Florida Branch, located in Miami and Jacksonville have announced a name change to Detroit Diesel Engine Division, General Motors Corp.

In Miami the address is 2277 Northwest 14th St., Miami 35. The phone is NEwton 4-6556. The Jacksonville address is 1061 West Forsyth St., phone ELgin 3-8491.

most versatile TORQUE CONVERTER

Now, from Allison, comes the world's most versatile torque converter—the Series 500 TORQMATIC—to give you more power over a wider working range and permit you to standardize on *one* type of converter for *all* your equipment.

In *one standard housing* it gives you a choice of 4 ranges, 7 torque ratios, 100 to 350 horsepower coverage.

It's available for practically any application—automotive, industrial or a combination of both.

And it's designed for rough, tough service in scores of fields—construction, mining, oil drilling, logging, materials handling—wherever gasoline or Diesel engines are used.

This new Series 500 TORQMATIC Converter embodies every engineering advance developed by Allison in building tens of thousands of TORQMATIC Converters over the past seven years.

In many applications it will permit the use of lower horsepower engines with no reduction in *working* power because it multiplies engine torque (true measure of an engine's *working* ability) from 250% to 360%.

And the new Series 500 TORQMATIC Converter will also permit engines to run in their best speed range—transmit more power in the high-speed range.

Soon you will be able to get the TORQMATIC 500 in scrapers, off-highway trucks, log loaders, drilling and servicing rigs, shovels, cranes, graders, industrial locomotives, ditchers and shovel-type loaders made by a score or more manufacturers.

For the names of these manufacturers and full details on the TORQMATIC *Series 500 Converter write to:*

Allison Division of General Motors
Box 894D, Indianapolis 6, Indiana

HORSEPOWER GM Allison TORQMATIC DRIVES

Graders

Cranes

Shovels

Northeast Diesel Notes

By **Arnold B. Newell**

THE R. T. C. Shipyard at Camden, N.J., has received a contract to build three diesel tugs to be powered by Fairbanks Morse diesels for the Dalzelle Towing Company of New York. These are for charter to the New York, New Haven and Hartford Railroad. The new tugs are to Tom Bowes design and somewhat shorter than previous boats of his design in railroad service. However, they will be more powerful than the earlier 1600 hp boats. The additional power is intended to cope with the very arduous conditions of railroad float and barge towing through the swift tides at Hell Gate which has never shown any sign of reforming its treacherous ways.

CANADIAN National Railways is now operating the new luxury motorliner *Bluenose* between Bar Harbor, Maine and Yarmouth, N.S. This is one of the largest and most powerful passenger motorships in the Western Hemisphere. The passenger capacity is 500, automobile capacity is 150 and the speed is 18 knots attained with six Fairbanks Morse diesels at 2000 hp each.

THERE are plans afoot to build a 65 ft. ferryboat for the Vineyard Haven-Falmouth, Mass. run. The design is by Preston R. Gladding of Somerset, Mass. and Edward Athearn of Woods Hole.

A 100 x 25 x 12 ft. tug is to be built by the Blount Marine Corp. of Warren, Rhode Island, for an undisclosed owner. Propulsion will be by a Fairbanks Morse Model 38 D and O-P diesel with Falk transmission. A new system of keel cooling will be introduced.

HOWARD RICHARDS of South Easton, Mass., is having a 44 ft. dieselized motor sailer built in Paul Lukes yard at East Booth Bay, Maine.

PLANS are being made for construction of a new triple-screw diesel ferry to operate on the run from Bridgeport, Conn. to Long Island. Details not yet available.

JAEGER-Lembo Machine Co. of Flushing, L.I., has sold a Mantowoc crane to Mike Starrett of Patchoque, L.I. for general contracting work. This interesting equipment is propelled by a Cummins diesel while the crane is powered by a Waukesha.

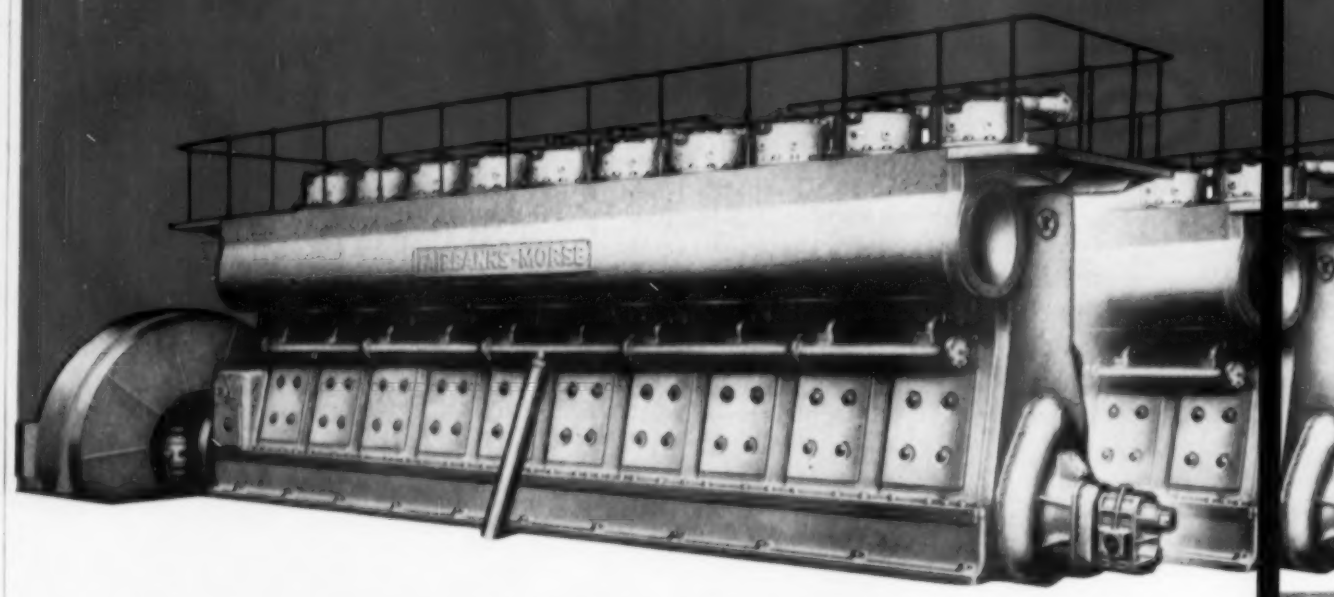
McGLYNN Diesel Service, Inc. has moved into attractive new quarters at 132-15 Northern Blvd., Flushing, N.Y. Tim McGlynn, formerly with the Cummins Diesel Engine Company ,has specialized in fuel injection servicing and is now the distributor for Roosa Master fuel injection pumps. In the new location fuel injection systems in general will be serviced and an excellent line of diesel parts will be carried.

THE scalloper *Guest*, owned by W. G. Wallin of Wildwood, N.J., was repowered early this year at the plant of the Hitchcock Gas Engine Co. at Bridgeport, Conn. The new engine is a Waukesha WAKD 240 hp. New tanks were also installed at the time of repowering.

THE Grandview Construction Co. working on the Massachusetts Thruway, purchased 15 Allis-Chalmers Model 1821 tractors for use on this tremendous project. The vendor is Frantz Tractor Co., Inc., one of the very large distributors of construction equipment with offices and service facilities in several towns and cities in the vicinity of New York.

AN example of the large amount of dieselized equipment used on the big road projects in the East is the purchase of some 40 tractors by Yonkers Construction Company all equipped with Twin

Fairbanks-Morse tops REA



Record 43,300 Hp. Performance

In the top four plants of the national REA competition, there is more than two and a half times as much Fairbanks-Morse horsepower as in all other engines combined—a total of 43,300 horsepower.

Never before has there been such a clear-cut record of efficiency, on such a broad base, in favor of any engine in this competition.

Look at some of the figures:

- First, F-M horsepower produced more than 2/3 of the total power generated by the top four winning plants.
- Three 3500 horsepower Model 31A's generated 82% of the power in the top award-winning Johnson plant.
- Two exclusive F-M powered plants placed second and fourth with only a spread of .1 mill between them.
- One Model 31 in the Top Plant carried the highest penalty of longest operation on straight oil—yet efficiency was higher than plant average.

Here, in engine after engine, is a record of operating standards of efficiency unequaled by any other engine in such numbers.

You Can't Make a Better Power Buy Than a Fairbanks-Morse Diesel or Dual Fuel Engine

FAIRBANKS-MORSE

a name worth remembering when you want the best

DIESEL AND DUAL FUEL ENGINES • DIESEL LOCOMOTIVES • RAIL CARS • ELECTRICAL MACHINERY • PUMPS • SCALES
HOME WATER SERVICE EQUIPMENT • MOWERS • MAGNETOS

Disc torque converters. The sale was made by Frantz Tractor Company and the equipment is Allis-Chalmers, in various models.

CUMMINS Diesel Sales Co., Bronx, N. Y., has in hand a large project of repowering 111 concrete trucks and dump trucks for the Colonial Sand and Gravel Co., who are operating some 500 pieces of Cummins powered equipment. A number of trucks of other makes are also being repowered at the same plant. The engines used in this project are HRFB.

NEW Cummins diesels have been in- generator set has been installed by the National Foundation for Infantile Paralysis as an emergency stand-by unit in the Goldwater Memorial Hospital on Welfare Island, New York City. The prompt automatic takeover if central power fails could save lives of the patients, especially those in the iron lung. A drill is conducted once a week to be sure that the diesel cuts in as intended.

NEW Cummins diesels have been installed in two of the locomotives at Bush Terminal in Brooklyn, N.Y.

WE HAVE been reliably informed that the diesel part of the Wolverine Motor Works can be purchased from the new owners of the plant, Coulter & McKenzie, another Bridgeport company.

AMERICANS have always had a soft spot in their hearts for the Swedish American Line motor passenger liners, especially the old *Gripsholm*. They will therefore patiently await completion and eventual arrival of the new *Gripsholm* with her new Gotaverken diesels rated 18,600 hp at 117 rpm. These engines are designed for use of Bunker "C" or residual fuel which gives a substantial saving over the operating cost of a steam plant.

mass efficiency competition

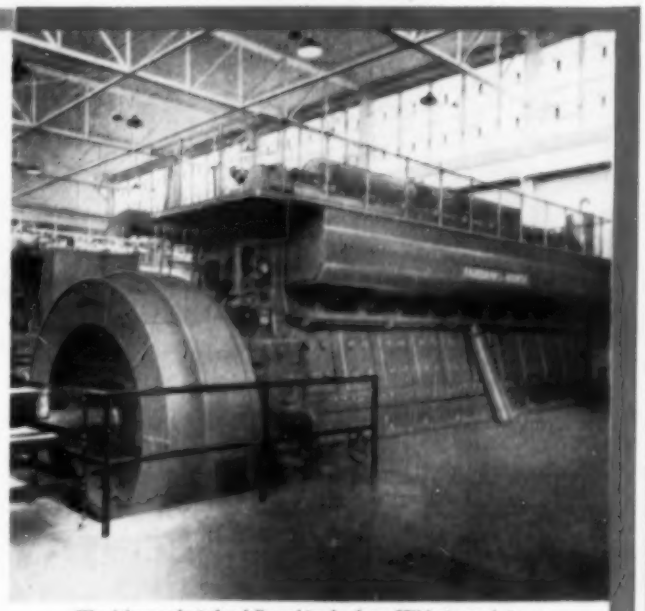
Outstanding Single Engine Performance

Engine No. 6 is one of three Fairbanks-Morse Model 31A 3500 horsepower engines that have helped keep the Johnson plant tops in efficiency for four years*. In winning previously, this engine set a record of 9213 BTU per kw-h—still unsurpassed by any engine today.

That winning record automatically selected the big No. 6 for the heaviest assignment to straight oil operation this year when gas supplies became short. *Yet*, the engine achieved an average of 9642 BTU per kw-h (Better than plant average) and during one period of operation maintained, an average of 8652.

That's approximately 40% thermal efficiency!

Under all conditions of load . . . penalties of straight oil operation . . . two high-altitude plant locations—close scrutiny of performance records of this year's winning plants clearly establishes the fact—you can't make a better buy than a Fairbanks-Morse Diesel or Dual Fuel Engine. Fairbanks, Morse & Co., Chicago 5, Ill.



*The Johnson plant also delivered top kw-h per BTU last year, but was eliminated from competition due to winning in two previous years

Tariff on Tuna Imports Doubled

WASHINGTON, March 17 — The President has issued a proclamation doubling the U.S. duty on imported canned-in-brine tuna when imports in any year exceed 20% of the previous year's domestic tuna pack. Local boat owners, who have been in desperate straits because of markets flooded by imports of canned tuna, said that their fleets will go to sea in full force when the proclamation goes into effect April 15.

Shipyards and tuna fishing boat equipment suppliers are expected to feel the upsurge in business within a very short time.

REMEMBER—page 7 of February issue of DIESEL PROGRESS, the heartfelt plea of the Tacoma Shipyard Association for national consideration of their desperate situation.

REMEMBER—pages 44-45 of this same issue—our own impassioned plea for help for the Tuna Industry.

REMEMBER—that DIESEL PROGRESS for that February issue was placed on the desk of every Senator and Congressman, plus seven key men in the Executive Offices in Washington—over 600 extra copies.

REMEMBER—page 56 of the March issue where A. B. Newell so masterfully briefed the serious situation facing our fishing fleets.

REMEMBER—that DIESEL PROGRESS was the only marine magazine to go to the help of the Tuna Industry when it needed help.

REMEMBER—that for twenty years DIESEL PROGRESS has consistently fought for and helped many segments of the BUYING end of the Diesel Industry.

Mid-Continent Diesel News

By **Jack F. Cozier**

SEISMOGRAPH SERVICE Corp., Tulsa, Okla., purchased a Caterpillar D7 tractor and dozer with a Hyster winch for exploration and seismograph operations in South America from McCormick Machinery Co., Tulsa, Okla.

R. L. Owens, Oklahoma City, Okla., bought a Euclid S-7 scraper powered by a GM 4-71 diesel for work on the Northeast Oklahoma turnpike. The sale was made by Butler-Sparks Equipment Co., Tulsa, Okla.

McNAMAR BOILER & TANK CO., Tulsa Okla., received a Buda 6MO-893 natural gas engine to be used to power a gas compressor in the Texas panhandle from Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

OZARK-MAHONING Co., Tulsa, Okla., purchased a Unit 1020 crane with a clam shell for operation in their chemical plant. The crane is powered with a GM 3-71 diesel and was sold by Midwestern Engine & Equipment Co., Tulsa, Okla.

FRANK CONKWRIGHT, Claremore, Okla., bought a Wisconsin butane engine for irrigation work on his Verdigris river farm. The engine is powering a Marlo 4E3S pump and was sold by Diesel Power Co., Tulsa, Okla.

K & E DRILLING, INC., Wichita, Kan., has received a GM diesel model 12107 from Diesel Equipment Co., Inc., Wichita, Kan., to be installed on a rotary drilling rig.

FOREMOST DAIRIES, INC., Abilene, Texas, operates in their fleet of milk transports four Mack and three Kenworth trucks all powered by Cummins NH engines. Maintenance figures from the service department of Foremost show that Cummins-powered trucks are operating at 3.2 cents per mile.

LELAND EQUIPMENT CO., Tulsa, Okla., purchased a 600 cu. ft. rotary Chicago-Pneumatic air compressor powered by a GM diesel engine, the unit will be added to Leland's rental fleet.

BARTLETT ENG. & Equipment Co., Tulsa, Okla., bought two Buda BD-77 diesels to operate two centrifugal pumps on barges for offshore operations from Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

MIDWESTERN Constructors, Tulsa, Okla., received three Unit 1020-A back hoes powered by GM 4-71 torque converter diesel engines from Midwestern Engine & Equipment Co., Tulsa, Okla. The three back hoes will be used in the state of Washington on the Pacific Northwest Pipe Line.

LEVELL COAL CO., Checotah, Okla., purchased a Cat D315 diesel engine as a replacement engine in a dragline shovel. The sale was made by McCormick Machinery Co., Tulsa, Okla.

FIELD QUEEN, INC., Maize, Kan., manufacturers of the Field Queen alfalfa cutter, have ordered four GM diesel engines model 3031C LH, from the Diesel Equipment Co., Inc., Wichita, Kan.

PAUL HARBOR, Jenks, Okla., has taken delivery on three Chrysler natural gas engines model IND-30 powering Marlo 4E1 pumps for irrigation. The sale was made by Diesel Power Co., Tulsa, Okla.

GRIFFIS-B & M CONSTRUCTION Co., Soda Springs, Idaho, bought a 600 cu. ft. Joy rotary air compressor powered by a GM 6-71 diesel engine and a

Mr. John N. Keen,
Manager,
Wolverine Electric Cooperative

600 cu. ft. Joy reciprocating air compressor powered by a International UD-24 diesel engine. The units were sold for pipe line construction by Butler-Sparks Equipment Co., Tulsa, Okla.

LAYMAN CONSTRUCTION Co., Tulsa, Okla., purchased a Cat #955 traxcavator for use on the construction and widening of U. S. highway 66. The unit was purchased from McCormick Machinery Co., Tulsa, Okla.

CITY OF CUSHING, OKLA., is now installing their new 2500 kw. Cooper-Bessemer model LSV-16-GDT dual-fuel engine in the municipal light plant.

GASO PUMP & BURNER CO., Tulsa, Okla., bought two Buda 8MO-1290 natural gas engines to power two figure 1753 pumps for delivery to a major pipe line company in South Louisiana. The engines were delivered by Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

MUSGROVE PETROLEUM CORP., Wichita, Kan., has accepted delivery on two GM 62403 RA diesels to repower one of their rotary drilling rigs. The sale was made by Diesel Equipment Co., Wichita, Kan.

ELDON SMITH, Quapaw, Okla., received two Euclid S12 scrapers powered by GM 6-71 diesels for work on the northeast Oklahoma turnpike. The sale was made by Butler-Sparks Equipment Co., Tulsa, Okla.

PIPKINS PIGGLY WIGGLY SUPER MARKETS, Eastland, Texas, operates four trucks out of their headquarters to their thirteen super markets located in West Texas. The road fleet includes two Kenworth trucks, one White and one repowered GMC truck, all four powered by Cummins HRBB diesel engines.

UNITED GEOPHYSICAL CO., Tulsa, Okla., bought two Cat D7 tractors and dozers with Hyster winches from McCormick Machinery Co., Tulsa, Okla. The units will be used for exploration operations in South America.

HAROLD SUTTON, Tribune, Kan., has had installed a GM model 3055C diesel engine in a Case LA farm tractor. The installation was handled by Power Equipment Co., Dodge City Kan. dealer under Diesel Equipment Co. Inc. Wichita, Kan.

POWER TRANSMISSION & Equipment Co., Seminole, Okla., received a Buda 8MO-1290 natural gas engine with torque converter for resale to a drilling contractor in Southern Oklahoma. The unit was shipped by Allis-Chalmers Mfg. Co., Buda Div., Tulsa, Okla.

General Sales Meeting Held

The 16th annual general sales meeting of Stewart & Stevenson Services was held recently in Houston and was attended by representatives of General Motors, Chrysler, Climax and Wade-Rain along with Stewart & Stevenson dealers and representatives throughout Texas. Ross Stewart, president of Stewart & Stevenson Services, and Joe Manning, vice president and general manager, presided at the meeting. It was the largest group ever to attend the general sales meeting, and marked the most successful year in the history of the company.

Mr. John Carsey, age 89, attended the meeting and was introduced by Mr. Stewart, as the "dean" of the Stewart & Stevenson Diesel Engine organization.

Mr. Carsey, in his address, recalled the growth of Stewart & Stevenson Engine Division from a small department of three men in 1938, to its present position of the nation's largest distributor of diesel engines.

to **COOK** for *Better* Rings!

WOLVERINE'S
Award-Winning REA Plant Uses
COOK PISTON RINGS!

Again the winner! In 1955 — for the third time in the last four years — these three 3500-HP Diesels helped win Diesel Progress Magazine's Award for Wolverine Electric Cooperative's Johnson plant as *"the most efficiently operated of all REA internal combustion plants in the nation"!*

All three engines are equipped with Cook Piston Rings. In 1955, each unit averaged 7,200 operating hours, and generated over 13,000,000 kilowatt hours. Maintenance costs for all three engines came to less than $9,000 for materials, and less than 1,600 man hours — most of it to secure maximum control of the fuel-oil injection system!

Here's what Mr. John N. Keen, Wolverine Electric Cooperative's Manager, has to say about Cook Piston Rings:

"We are pleased with the performance of our C. Lee Cook Piston Rings. We feel we have excellent lube oil control, as well as a minimum of cylinder wear".

Mail coupon today for product information and name of your nearby Cook representative. C. Lee Cook Co., Inc., Louisville 3, Kentucky.

TENSION THAT NEVER WEARS OUT!

Cook Piston Rings are tensioned on a Cook-designed machine which accurately controls the amount and distribution of tension. This exclusive process gently "squeezes" tension into the rings, with a series of small indentations—avoids harmful disarrangement of the rings' molecular structure. *The result is constant, uniform tension that never wears out!*

C. LEE COOK COMPANY

Sealing Pressures Since 1888

C. Lee Cook Company — Dept. DPO-64
916 South 8th Street
Louisville 3, Kentucky

Gentlemen: Please send me complete information on Cook Piston Rings and name of nearest representative.

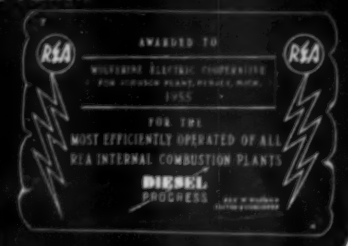
Firm_____
Street_____
City_____ State_____
Attention:_____
Type of Units_____

Ellwood City Precision Craftsmanship

A 5 TIME WINNER!

ONCE AGAIN, THE JOHNSON PLANT AT HERSEY, MICHIGAN, WOLVERINE ELECTRIC COOPERATIVE, WINS THE DIESEL PROGRESS EFFICIENCY AWARD PLAQUE. ONCE AGAIN, ELLWOOD CITY FORGE PLACES FIRST WITH ITS FORGINGS.

THE UTMOST DEPENDABILITY AND RUGGEDNESS BUILT INTO ELLWOOD CITY FORGE PRODUCTS MADE THEIR HELP AN EFFECTIVE CONTRIBUTION TO THE EXTRAORDINARY HIGH EFFICIENCY OF THE PLANT.



Ellwood City Forge meets the most exacting requirements of today's engine builders and operators. Consistent performance, minimum of maintenance requirements and lasting economy can go to work for you, too.

For heavy-duty power needs, make sure your next engine is specified with Ellwood City Forge. Send us your forging problems. Our experts will prove you can have top quality with low cost.

ELLWOOD CITY FORGE COMPANY

CRANKSHAFTS • CONNECTING RODS • MACHINE FORGINGS

ELLWOOD CITY, PENNA.

WOLVERINE WINS CONTEST FOR THIRD TIME

For 1956, REA efficiency award will be split in two, and a DIESEL PROGRESS plaque presented to each winner. Division 1 will be plants up to, but not over, 5,000 kw installed capacity, and Division 2 will be all plants over 5,000 kw.

By REX W. WADMAN

FOR the third time, the Wolverine Electric Cooperative's Johnson Plant at Hersey, Michigan, has been acclaimed as the most efficient REA internal combustion generating station in the nation. Winner in the fifth year of the national competition sponsored by DIESEL PROGRESS, the Michigan plant improved on its notable operating record of 1952 and 1953 to take the honors again for top-ranking 1955 performance of its six fine engines, three Cooper-Bessemer and three Fairbanks-Morse dual-fuel engines.

The award is given to the plant which produces a kilowatt-hour most economically and, to insure that this cost reflects operating efficiency rather than availability of cheap fuel, the cost of fuel for all plants is equalized at 40 cents per 1,000,000 Btu. The plants are selected by the Rural Electrification Administration on the basis of official operating reports submitted to Washington by all REA cooperatives. After adjustment of fuel price, the plant which achieved the lowest operating cost per kilowatt-hour is certified as the winner and is awarded a bronze plaque by DIESEL PROGRESS.

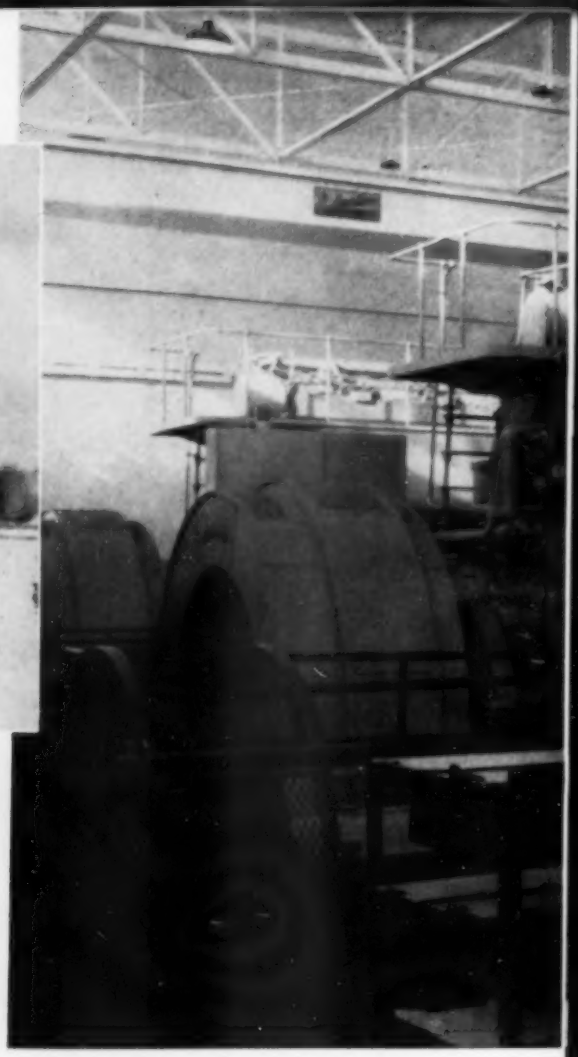
Wolverine Electric Cooperative, its directors, its managers, and its operating crew have every reason to be very proud of this outstanding achievement—the winning of this DIESEL PROGRESS Award three times out of five years.

It is well to remember that the three Cooper-Bessemer diesels, and the three Fairbanks-Morse diesels have their share of honor accruing to them because, if the six engines had not been on the job when needed, this very close contest could not, and would not have been won by Wolverine.

In order to widen the scope of the contest, the REA Administration and ourselves have agreed that starting with this year of 1956 we will split the contest into two divisions to make it possible for the smaller, yet equally important REA plants to win a plaque, as it is for the larger installations. A plaque will be presented to the winner of Division I, which will consist of that group of REA internal combustion plants with an installed capacity up to, but not exceeding, 5000 kw. Division 2 will naturally consist of all REA internal combustion plants with an installed capacity of over 5000 kw. The same rules will apply to the adjustment of fuel costs, and the figure of 40 cents per 1,000,000 Btu will again be used for 1956.

Another rule has been added for this year, and later years, that no REA plant can win a DIESEL PROGRESS plaque two years in a row. Both of the plants winning it in 1956 will sit out 1957.

It gives me a great deal of pleasure as Editor and Publisher of DIESEL PROGRESS to pass this word out to the REA internal combustion plants: that there will be two plaques this year instead of one. I feel that this contest has given a good account of itself in the past five years and achieved the purpose behind its conception—to improve the overall operating efficiency of the Rural Electric Cooperatives using diesels, dual-fuel or natural gas engines. On the following four pages, Mr. Gottlieb, who has written up the winning plant for the past three years again brings you details of the Wolverine Electric Cooperative's achievement, and how they accomplished it.



WOLVERINE TOPS REA THIRD TIME IN FIVE YEARS

By WM. H. GOTTLIEB

FOR the third time in five years, the Wolverine Electric Cooperative's Johnson Plant at Hersey, Michigan, has won the DIESEL PROGRESS award as the nation's most efficiently operated REA internal combustion generating station. This plant was first acclaimed in 1952, then again in 1953. Official operating reports for 1955 filed with the Rural Electrification Administration again showed the plant to have the nation's lowest operating cost per net kilowatt-hour after application of an equalization factor to account for variations in fuel price.

The same six-engine team of dual-fuel engines and, in the main, the same efficient operating staff have achieved the triple victory. The prime movers are three identical 3,500 horsepower Fairbanks-Morse diesels and three smaller Cooper-Bessemers, one rated at 1650 hp. and two at 1010 hp. Plant production reached a new high of 47,512,910 kw. hrs. in 1955 and the three big engines continued to carry the bulk of the load, producing 39,357,500 kw. hrs. or 82.8 per cent of the total.

In generating the total of 47,512,910 kw. hrs., the plant consumed 240,892,900 cu. ft. of natural gas and 1,584,461 gal. of fuel oil, an average of 5.07 cu. ft. of gas and 0.0333 gal. of oil per kw. hr. With gas at 1010 Btu. per cu. ft. and fuel oil at 138,532 Btu. per gal., this represented a fuel heating value of 9733 Btu. for each kw. hr. produced.

Wolverine Manager John N. Keen, from the outset a key figure in the design and operation of the power cooperative, reports that 1955 had its problems, notably a shortage of natural gas. Wolverine was never blessed with a convenient and abundant fuel supply. Fuel oil, with attendant transportation costs, is expensive in north-central Michigan and the cooperative has not been able to get gas from the giant pipe lines. The enterprise of Mr. Keen and the Wolverine board of directors encouraged development of two small local gas fields, the entire output of which was contracted for before the wells were drilled. Unfortunately, gas flow from these fields has diminished as the plant's need for gas increased. In December, 1954, the Hersey engines used 22,902,900 cu. ft. in generating 3,767,800 kw. hrs. In December, 1955, the plant could obtain only 16,557,500 cu. ft. although generation was up to 4,647,590 kw. hrs. This meant, of course, that the dual-fuel engines were forced to use much larger quantities of fuel oil. Though all the engines were fed a heavier diet of oil, the big No. 6 unit was most commonly assigned to straight oil operation. Yet the F-M engine achieved an average of 9642 Btu. per kw. hr. (better than the plant average) for the year of mixed service.

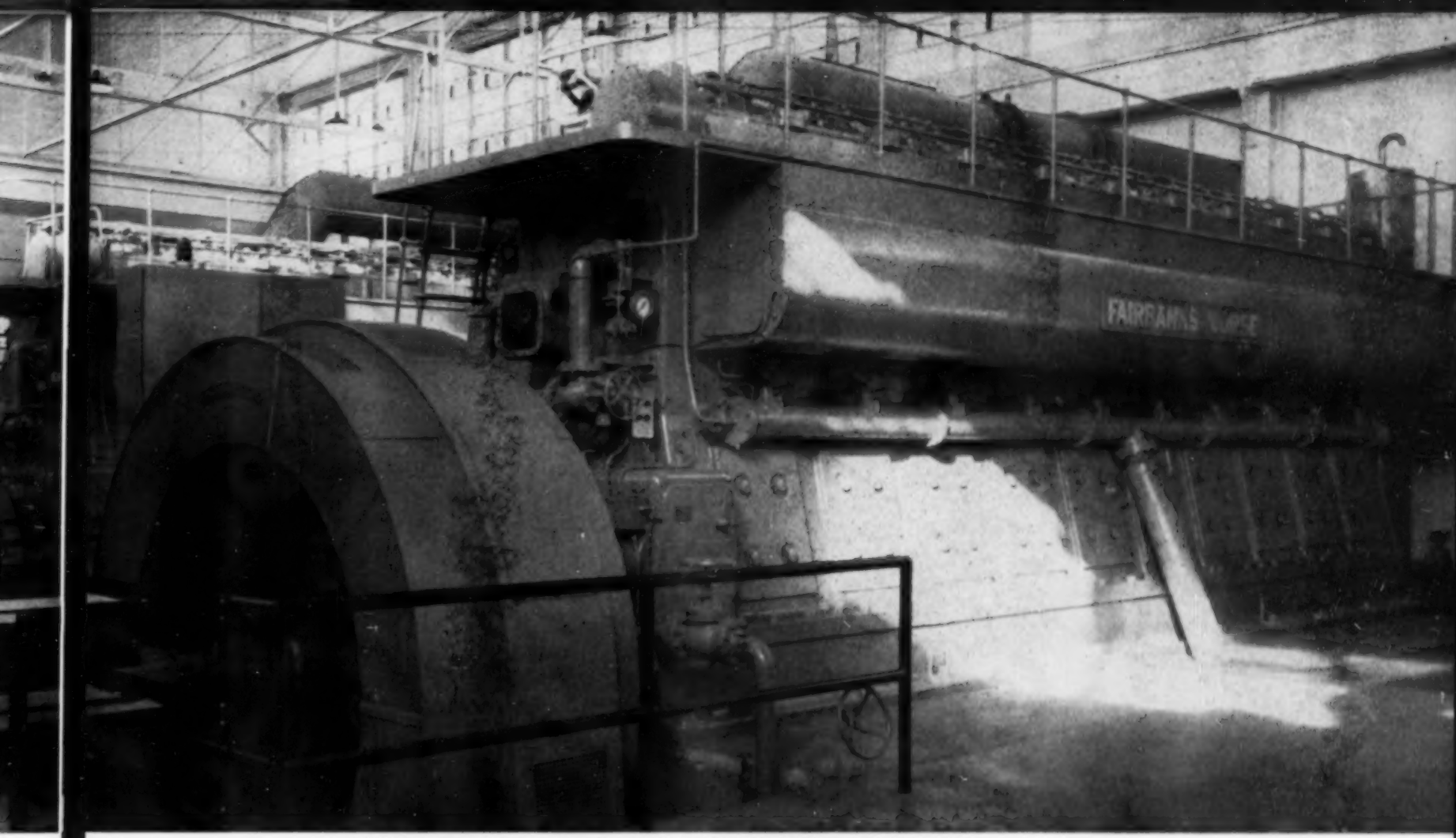
Wolverine management does not sit on its hands when there is a problem to solve. Co-op officials arranged to tap a third gas field north of Reed City, requiring construction of 6 miles of 4-in. line to supply the plant. When construction of the pipeline lagged, the co-op encouraged swift completion of the project by purchasing $75,000 worth of gas for future delivery. By the time this is published, the new line should be carrying an ample supply of gas to Hersey.

The gas shortage caused Mr. Keen to scrutinize fuel oil prices more closely than ever. In previous

Here is how the top 5 plants finished the DIESEL PROGRESS contest for 1955. Top table gives results before fuel adjustment, and the bottom table gives results after adjustment.

Project	*Plant*	*Installed Capacity KW*	*Gross Generation MWH*	*Plant Factor %*	*Actual Prod. Expense Mills/KWH*
N.Mex.23	Lovington	12,030	41,641	38	4.32
Kans. 51	Scott City	9,380	31,571	38	4.597
Okla. 32	Woodward	4,400	17,430	45	4.600
Kans. 34	Great Bend	10,520	34,929	38	4.78
Mo. 60	P. Bluff	9,404	48,143	58	5.36

Project	*Plant*	*Installed Capacity KW*	*Gross Generation MWH*	*Plant Factor %*	*Adjusted Prod. Expense Mills/KWH*
Mich. 46	Hersey	10,065	47,513	54	5.47
Kans. 51	Scott City	9,380	31,571	38	5.99
Mo. 60	P. Bluff	9,404	48,143	58	6.03
N.Mex.23	Lovington	12,030	41,641	38	6.10
Kans. 34	Great Bend	10,520	34,929	38	6.16



Major power producers are these three Model 31AD18 Fairbanks-Morse dual-fuel engines, each rated 3500 hp at 277 rpm. Each engine drives an F-M alternator. Also visible is the Woodward governor.

years the plant had used a blend of 70 percent gas oil and 30 percent No. 3 diesel fuel, combined at the refinery, at an average cost in 1953 of 10 cents a gallon. Today the prime fuel oil is a No. 4 gas oil and Wolverine has been experimenting on blends with No. 6 fuel. In the face of generally rising prices, the average cost per gallon in 1955 was held to 9.37 cents. Restricted use of gas inevitably raised the fuel cost per kw. hr. to the highest point in four years, but the plant kept fuel consumption to a minimum and held the line on other costs. Though gas and fuel oil totaled 5.05 mills per kw. hr., total production expense, including fuel, operation, supervision and engineering, station labor, lubricating oil, supplies, and maintenance and came to just 6.50 mills. Adding such overhead costs as depreciation, taxes, interest, insurance and administrative, the total was still just 9.10 mills. With gas again abundant, the plant expects to trim down again to the 1954 total production expense of 5.05 mills (7.97 with overhead).

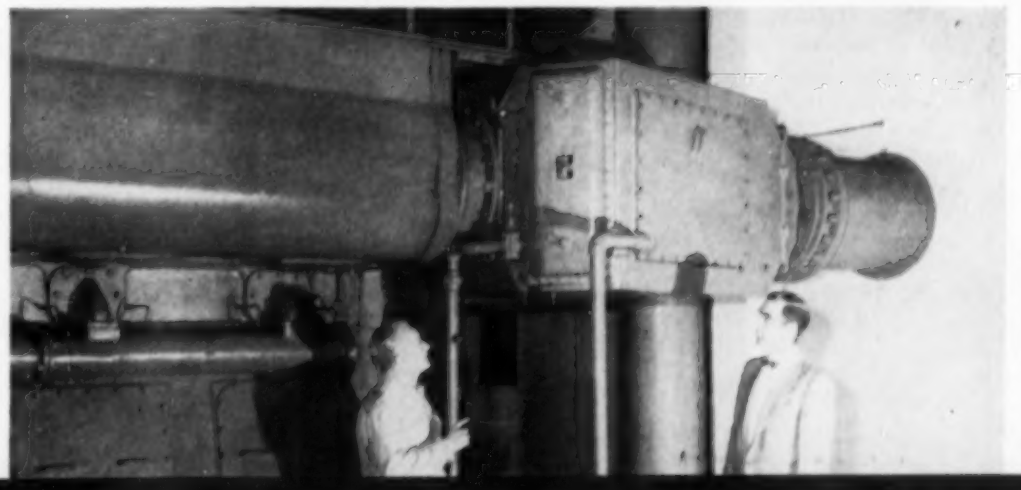
Cost Computation of Net Energy Generated

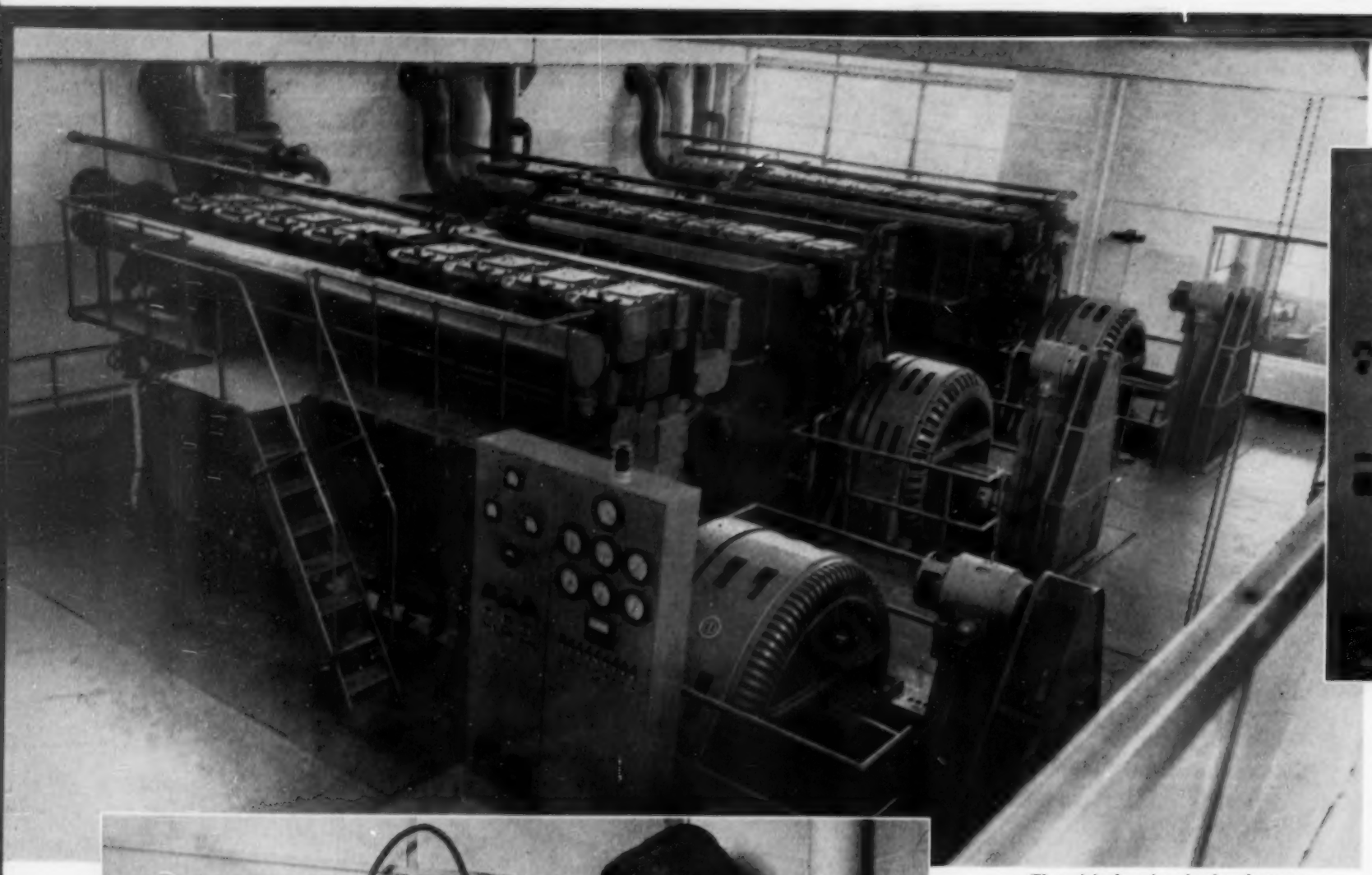
Expense Items	*Total Dollars*	*Mills per Kwh.*
Operation, Supervision, Engineering	$ 305.66	.007
Station Labor	31,076.90	.674
Fuel Oil	148,501.27	3.222
Fuel Gas	84,346.94	1.830
Lubricating Oil	14,376.09	.312
Supplies and Other Operating Expenses	3,094.33	.067
Maintenance	17,966.61	.390
Total Production Expense	$299,667.80	6.502
Overhead Costs		
Depreciation	$ 50,973.16	
Taxes	9,704.74	
Interest	32,518.13	
Insurance	3,726.06	
Other Admin. & General	22,587.38	
Total Overhead Costs	$119,509.47	2.593
TOTAL PRODUCTION COST	$419,177.27	9.095

Wolverine management knows where to economize and where to spend its dollars. For example, the co-op buys a good heavy-duty lubricating oil, yet has been able to cut the price 5 cents a gallon by switching from box car lots of drums to tank truck delivery. The plant has two 4,000-gal. lube storage tanks outside and a 2,000-gal. tank in the basement from which oil is pumped to the engines as required. There is no attempt to skimp on preventive maintenance of the diesels. Operators have always paid close attention to fuel pumps and nozzles in an effort to promote fuel economy, a program all the more important during a period of experiment with new fuel oil blends. Management regards pay for operators as another place where money is well spent. It is the policy here to pay good wages and to give increases to plant operators every year. Mr. Keen believes it is good business to find and hold good personnel and to provide them with incentives to keep improving the plant and its operation. Incidentally, Wolverine is justly proud of its safety record—not a single lost-time accident since the cooperative was formed in 1949.

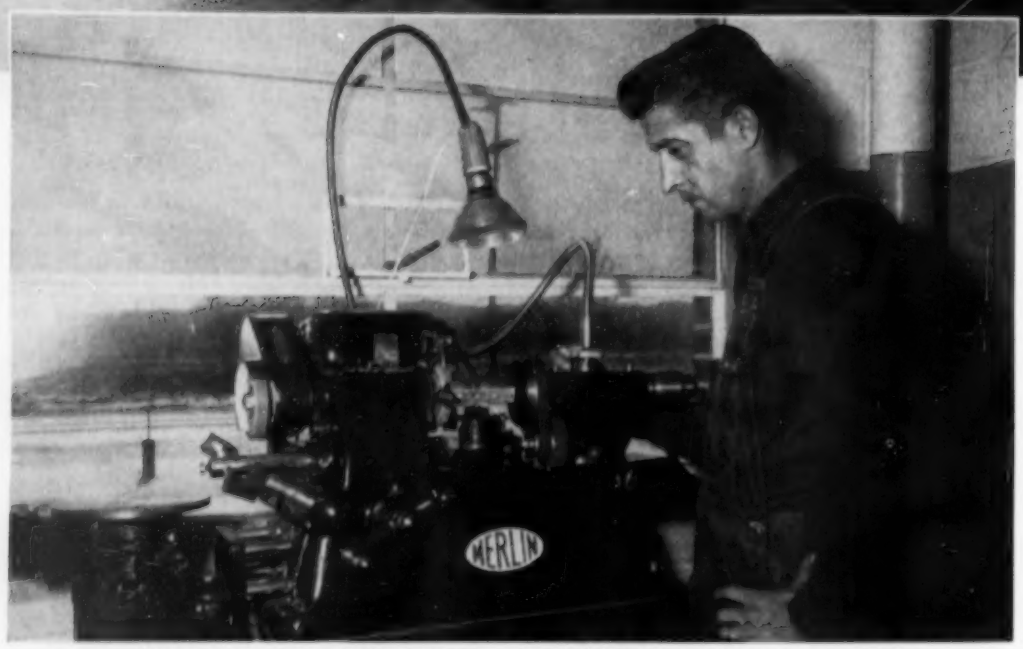
Wolverine's job, says Mr. Keen, is first to provide

Manager John Keen and chief operator Lockwood inspect Ross air coolers on one of the Fairbanks-Morse engines. Scavenging air from the motor-driven blowers passes through intercoolers into the intake headers of the F-M engines.





The original engines in the plant are these three Cooper-Bessemer dual-fuel units, one 1650 hp, Model LS-8-GDT and two 1010 hp, Model JS-8-T. The Kirkhoff gauge board with Westinghouse gauges and Alnor pyrometer serves all three engines.



Maintenance operator Delbert Roggow services fuel injection nozzle needle on a Merlin grinder.

a dependable power supply and then to strive constantly for greater economy to provide the Michigan farmer the best possible rates. The proportions of the job have grown vastly since 1946 when the O & A Electric Cooperative built a small plant at Hersey and installed two 1010-hp. Model JS-8-T supercharged Cooper-Bessemer diesels, followed early in 1949 by a 1650-hp. Model LS-8-GDT unit of the same make. Then O & A joined with Tri-County Electric Cooperative and Oceana Electric Cooperative to form Wolverine and the plant at Hersey was assigned to carry base load for the integrated system. To meet this demand, the building was tripled in size and three 10-cylinder, two-cycle, Model 31AD18 Fairbanks-Morse dual-fuel engines were installed. Each of these 18 x 27-in. units is rated at 3,500 hp. at 277 rpm. The first went into service in October, 1951, the second in December, 1951, and the third in February, 1952. There are four identical units in the Wheatland Co-op. plant at Scott City, Kan., and four more in the Lea County Co-op. plant at Lovington, N.M., which placed second and fourth in the 1955 competition.

By the end of 1955, the young power cooperative was serving 18,444 connected consumers who purchased an average of 305 kw. hrs. a month. Farmers in nearly a third of the State of Michigan depended on Wolverine and the plant at Hersey delivered 72 per cent of the system's net generation of 63,979,235 kw. hrs. (An additional 3,852,970 kw. hrs. were purchased during the year.) The big plant was on the line delivering power every minute of the year, at times carrying a 10,200 kw. load, above its rated capacity of 10,065 kw. The 3500-hp. base load units were in service most of the time: 7,498 hours for the No. 4 engine in generating 13,065,100 kw. hrs.; 7,365 hours for No. 5 in producing 13,623,900 kw. hrs.; and 6,795 hours for No. 6 in generating 12,668,500 kw. hrs. The smaller diesels showed increased service too: 3,914 hours and 2,171,450 kw. hrs. for No. 1; 2,709 hours and 1,477,790 kw. hrs. for No. 2; and 5,377 hours and a 4,506,170 kw. hrs. for No. 3.

This is a comparatively new power plant, yet already it can boast some impressive service records. After just four years, each of the three big engines has rolled up around 25,000 hours of operation. The No. 4 diesel has run 25,084 hours and generated 44,466,800 kw. hrs. The No. 5 engine has run 24,802 hours and produced the top total of 48,466,800 kw. hrs. The No. 6 unit has operated 24,897 hours and generated 45,348,700 kw. hrs. In four years, the plant's six engines have turned out no less than 162,337,860 kw. hrs. The plant achieved its 1955 average of 9733 Btu. per kw. hr. with engine load factors ranging from 69 percent for the big No. 4 engine to 79 percent for the small No. 1 unit. All the big engines averaged less than three-quarter load. Heavier loading of the plant and the individual engines can be expected in 1956 when a more abundant gas supply will make it more advantageous to carry all possible load at Hersey. The result should be not only

Chief Operator Germaine Lockwood (front and center) lines up with the full operating staff at the Hersey Plant to note the station's third DIESEL PROGRESS award. The plaques for 1952 and 1953 can be seen on the panel behind them.

Wolverine Manager John N. Keen points to the site of the prize-winning Hersey plant as he discusses operating plans with Office Manager Robert J. Holzschu (left) and Superintendent S. Donald King (right).

cost reduction but greater fuel efficiency. The potential is indicated by the record achieved in months when loads were more favorable. For example, in April, 1955, the big No. 6 engine produced 919,200 kw. hrs. on 43,941 gals. of oil and 1,850,600 cu. ft. of gas for a fine average of 8652 btu. per kilowatt hour, which is much below the guaranteed fuel consumption for the load average during the month.

The demands on Wolverine's power production system continue to grow. In part, this can be ascribed to growth in the number of consumers served. There are few farm homes not connected to the lines of the three distribution co-ops fed by Wolverine's diesels. In addition, hundreds of new homes are being built for workers in a group of new chemical plants, and the REA co-ops are in the best position to serve them. The diesels at Hersey generate power for the 8th Army's anti-aircraft training base at Camp Claybanks, a load that seems to grow and grow. Basically, though, the growth in consumption of electricity can be traced primarily to increased use of appliances, air conditioners, home laundries, television, electric heating. This, in turn, can be traced to rate structures which encourage volume use of electricity and compare favorably with municipalities and utilities despite lesser density of consumers.

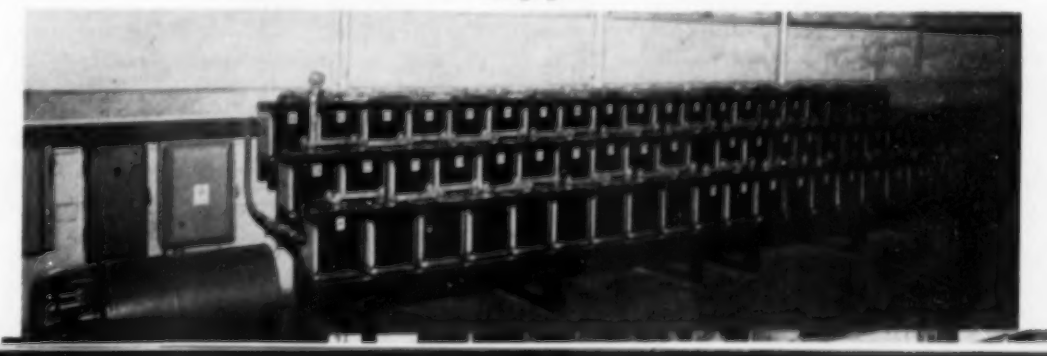
The problem has been to build the off-peak load, utilizing idle capacity and improve load factors. Wolverine has a contract to supply off-peak power to the municipal electric system of the City of Portland and provided 2,946,000 kw. hrs. in 1955. This arrangement saved money for the city and made money for the REA co-op. Peak demand of the entire system was 11,000 kw. in 1953, rose to 13,000 kw. in 1954, and up again to 15,000 kw. in 1955. Mr. Keen estimates that the demand will reach 27,000 kw. by 1960—with the sober realization that all such estimates in the past have proved to be conservative. It is comforting to know, though, that there is room in Hersey plant for more of the efficient big diesels that have brought national recognition to Wolverine in three of the last four years.

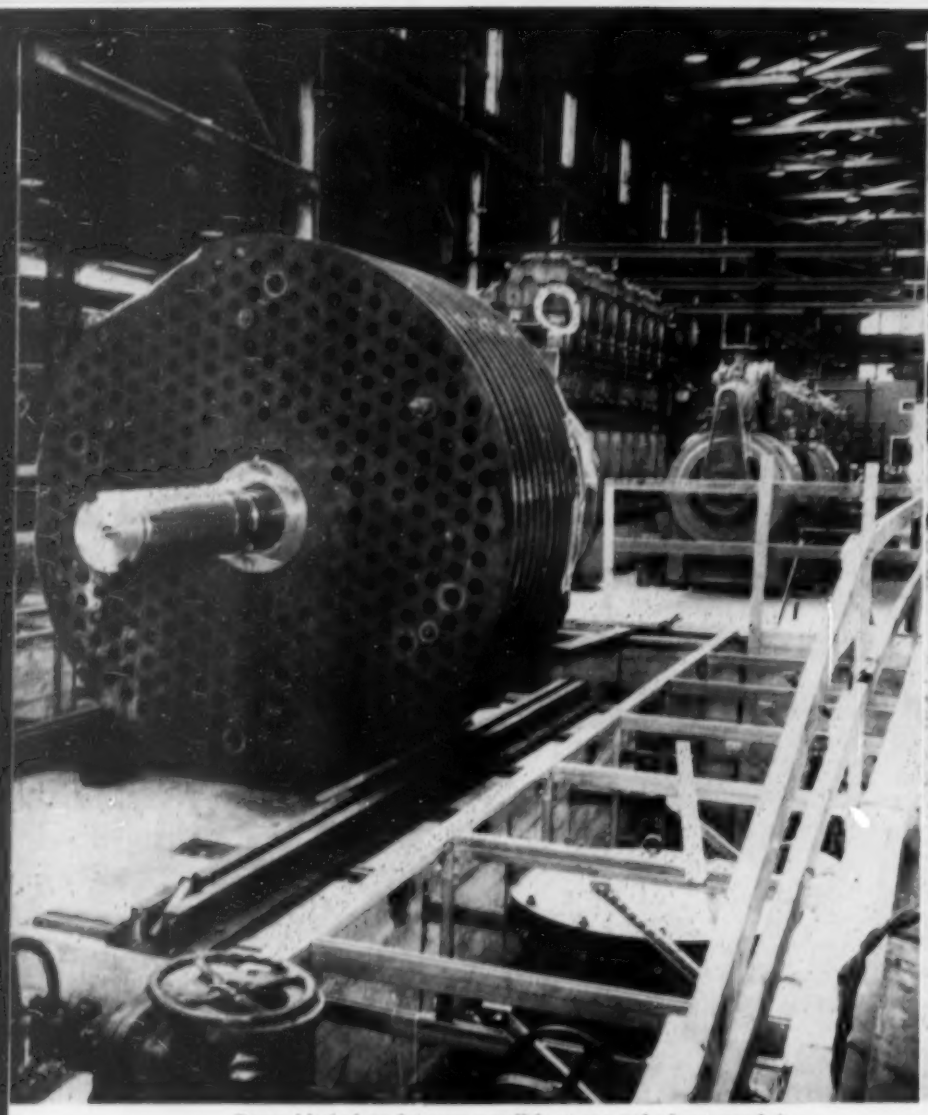
Good equipment and skilled operation has been the prize-winning combination at Wolverine. The executive staff at headquarters in Big Rapids consists of Manager John N. Keen, Superintendent S. Donald King, and Office Manager Robert J. Holzschu. Chief Operator Germaine Lockwood heads the operating staff at Hersey. The officers and directors of the cooperative, Carl C. Johnson, president; Harry Burmeister, vice-president; Leonard Balgoyen, secretary-treasurer; and board members Eugene Ten Brink, Glen Chase and I. E. Royer, have given active guidance and support in Wolverine's spectacular development.

List of Equipment

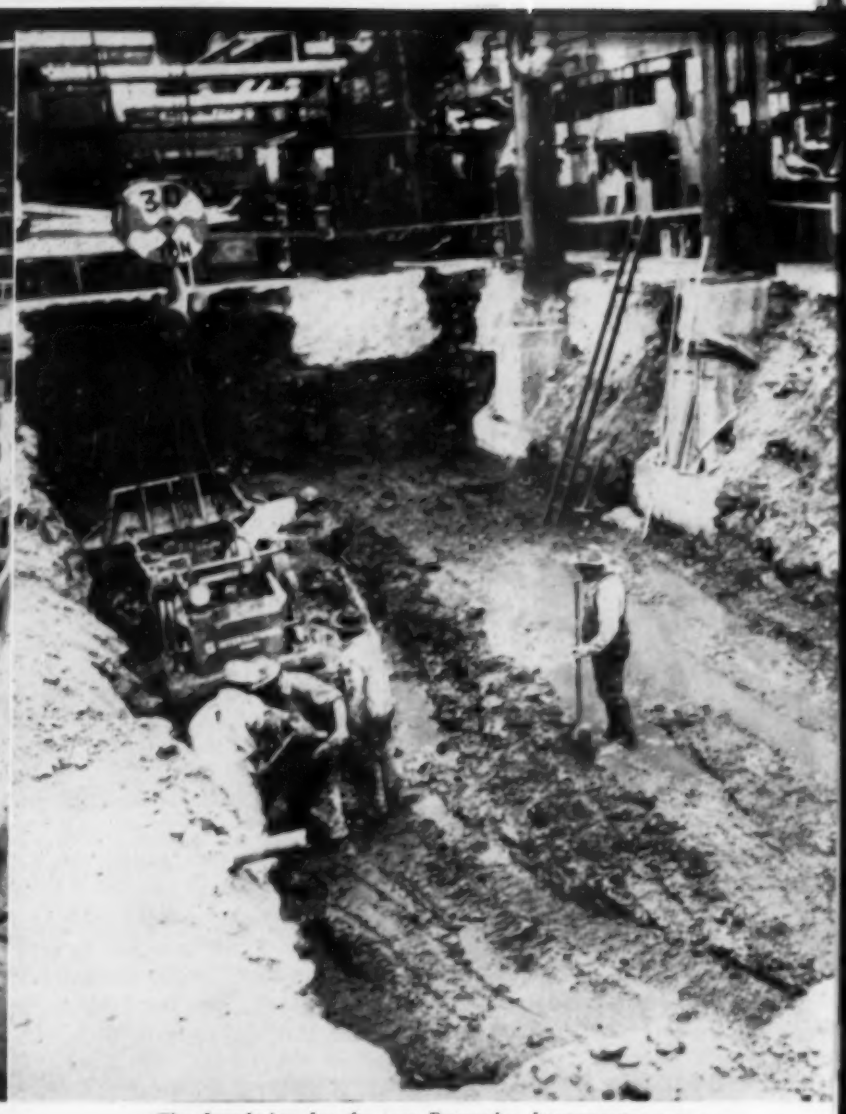
Engines—Three 10-cylinder, two-cycle, 3500-hp., Model 31AD18, dual-fuel engines of 18-in. bore and 27-in. stroke operating at 277 rpm. Fairbanks-Morse.
Two 1010-hp., Model JS-8-T, dual-fuel engines. Cooper-Bessemer.
One 1650-hp., Model LS-8-GDT, dual-fuel engine. Cooper-Bessemer.
Alternators—Three on the F-M engines: Fairbanks-Morse.
Three on C-B engines: Ideal Electric.
Governors—Woodward.
Blowers—Roots-Connersville.
Turbochargers—Elliott Buchi.
Radiators—On 1010-hp. C-B engine. Young.
Air filters—On F-M engines. Continental self-cleaning.
On C-B engines. Air Maze.
Raw water screen—Link Belt.
Heat Exchangers—On F-M. Ross. On 1650-hp C-B. Alco Products.
Lube Oil—Texas Co. Texaco Ursa 1623.
Lube Screens—On F-M. Air Maze.
Lube Filters—On C-B. Cuno, Briggs and Hilco
Lube Coolers—On F-M. Ross. On C-B. Ross and Alco Products.
Lube Transfer Pumps—Viking Pump Co.
Fuel Transfer Pumps—On F-M. Fairbanks-Morse. On C-B. Roper.
Intercoolers—Ross.
Piston Rings—On F-M, C. Lee Cook. On C-B. Pedrich and American Hammered.
Fuel Filters—On F-M, Nugent.
Day Tank Level Gauges—On F-M. Rochester, Liquidometer.
Gas Meters—On F-M. Roots Connersville.
On C-B. Rockwell.
Pyrometers—Alnor.
Thermometers—On F-M. DPS.
Starting Air Compressors—Quincy. Ingersoll-Rand
Battery—Exide.
Injection nozzle grinder—Merlin.
Bearings—On F-M. Federal Mogul.
On C-B. Cooper-Bessemer Corp.

The Exide "Manchex" battery provides current for emergency lighting and for electrically operated switchgear. The Westinghouse motor-generator set at left is used for battery charging.





Rotor, blocked up between parallels at one end of test stand, is ready for installation. Cuts from plate perimeter were made during dynamic balancing of rotor by Pelton Water Wheel Co.



The foundation for the new Enterprise dynamometer was a project in itself. Supporting columns had to be underpinned and extended full depth of pit. An International dozer excavated.

THE ENTERPRISE 10,000 HP DYNAMOMETER

Mammoth Dynamometer Installation Rates As Largest On West Coast

AS ITS 10,000 hp, 400 rpm hydraulic dynamometer spun in successful engine test operation late last year, Enterprise Engine & Machinery Co., San Francisco, became the West's leader in engine test facilities. A simple fact, and a source of pride to Enterprise, of course, but also significant to the diesel power industry. It's well to know what sort of need—and what business and technological outlook—spurs a company to the outlay of over $250,000 for machinery of this type. It's also well to know what they got for their large investment.

For Enterprise, the need was a simple and straight-forward one. Building for today's range of diesel power needs, the company simply lacked total dynamometer capacity in its one electrical generating dynamometer system. And, designing well ahead of today's diesel engine, Enterprise engineers could easily see the need for greater dynamometer capacity in a single unit. For example, Enterprise's new RV-series engines are rated over 7,000 hp. Tests of the first model were scheduled to begin early in January.

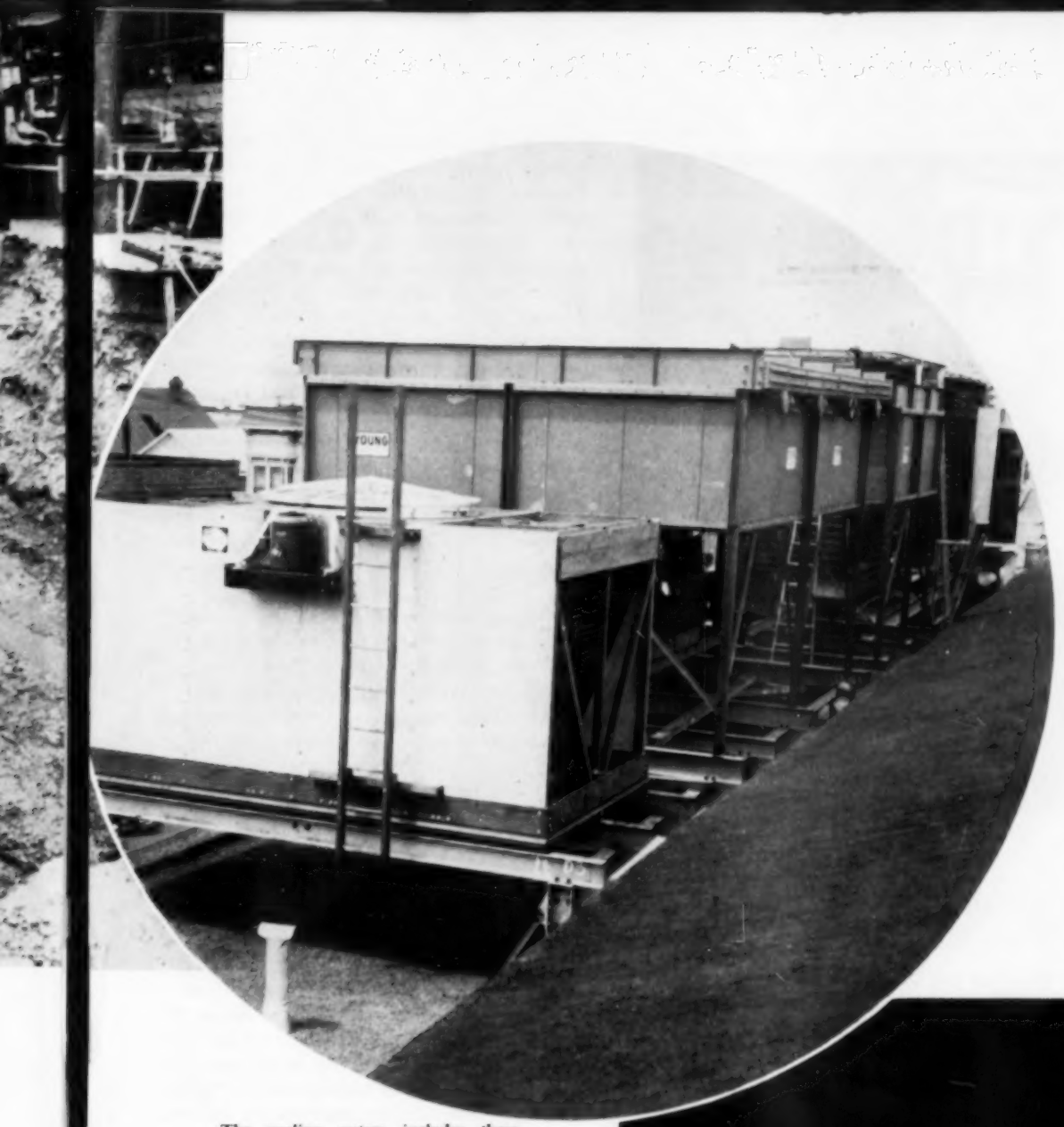
Size is unquestionably the most startling thing about the new dynamometer. It weighs over 90,000 pounds, including its shaft and rotor and the two halves of its casing and stator. The assembly is compact, but even so it is over 13 ft. long and 10 ft. in diameter. At the coupling, its rotor shaft measures 13¼ in. in diameter. This unduplicated piece of test machinery is swung from trunnions in a specially built concrete pit 76 ft. long and 22 ft. wide. Foundations are provided for assembly of an engine for test at either end. The pit contains all utility piping for circulation of fuel, lube oil, and water to various systems. Finally, almost out of sight is an extensive cooling system erected on the roof of an adjoining plant bay. In short, it looks like $250,000 worth. Let's see what Enterprise's detailed thinking was.

The first known need, as pointed out earlier, was for more test capacity. This fact guaranteed an expensive machine. It also suggested that considerable time would be needed to plan the dynamometer, draw up specifications for it, award a contract or contracts, and finally see the thing built. Enterprise engineers knew their own development and production schedules. On this basis it appeared faster to design and build their own machine. Making this tentative decision immediately put the Enterprise design engineers on notice to provide for every feasible functional point that would be of advantage to Enterprise. A couple of major concepts are worth note:

(1) Engines suited for test on this "brake" would be big—so big they would be assembled on the test stand, and then taken down again for shipment afterward. To avoid production bottlenecks, the new dynamometer would be positioned and designed to take engines for test at either end.

(2) Engines for test would include marine models, in pairs, having opposite shaft rotation. To fit this need, the new dynamometer would be built for rotation in either direction.

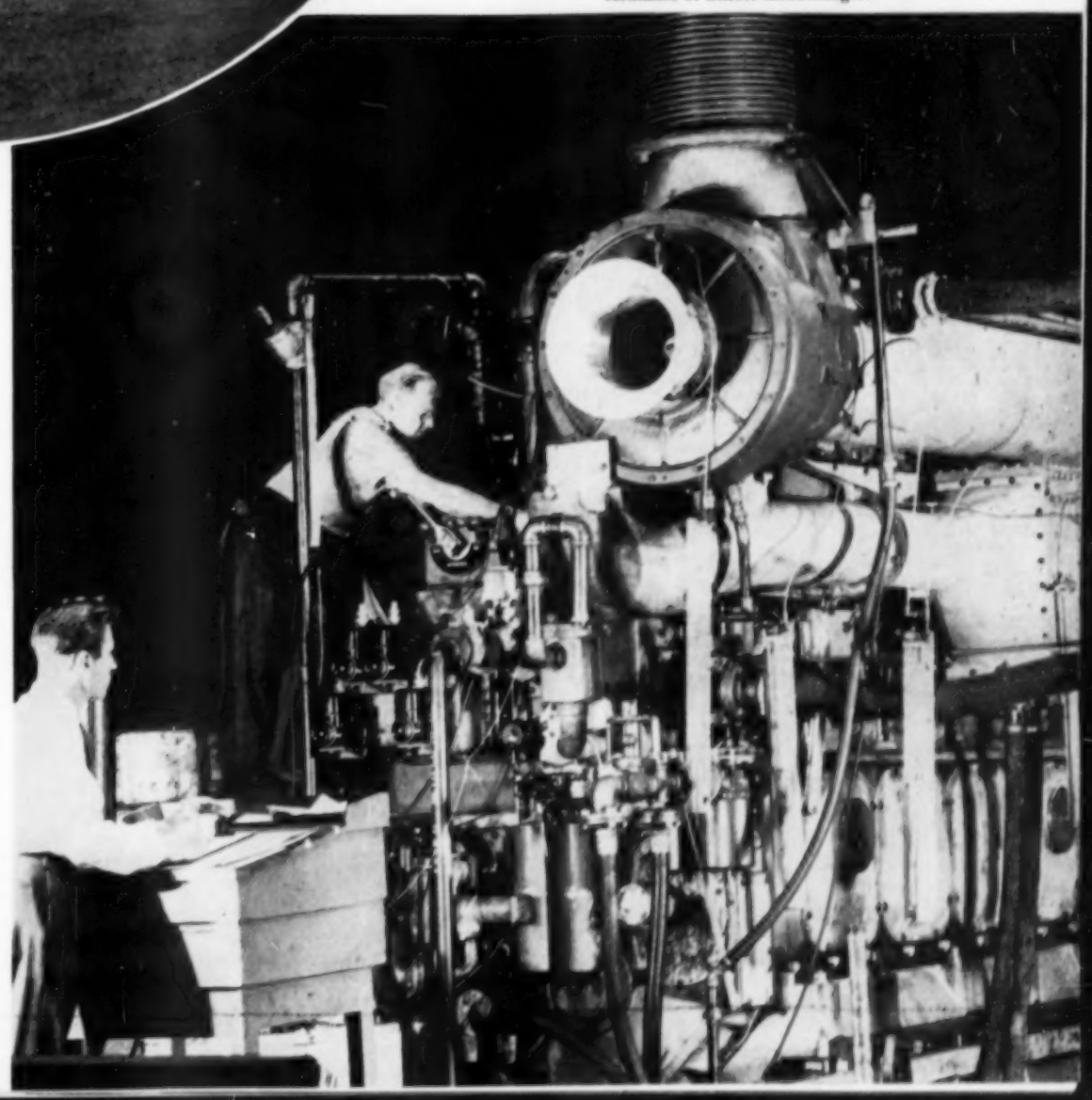
Beyond these functional points of tailoring the installation to the Enterprise plant, its production system and product line, there remained many,



The stator plates did not create such problems of assembly. They were flame cut in half, and each half welded into place inside the corresponding halves of the dynamometer casing. Steel for the stator plates was the same as for the rotor, and about the same pattern of holes was followed: 180 3-in. holes in each semi-circular plate. Actually, the plates were a little less than semi-circular, to assure clearance when the casing was assembled. Tightness of the casing joint was the important thing here, to guard against leaks. Roughness of workmanship in the stator and rotor plates did not matter. As a matter of fact, of course, inefficiency was desired!

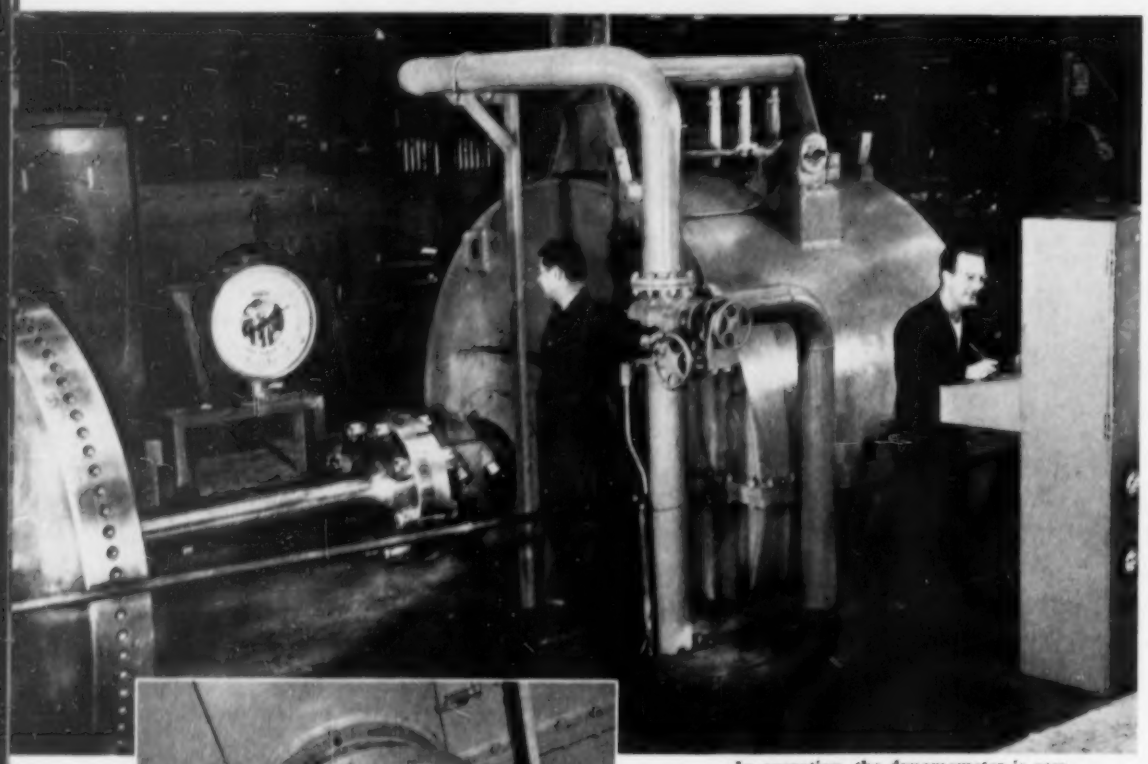
Enterprise's unique weir gate design is a large scale refinement of a principle first tested in a 26-in. hydraulic dynamometer built by Don Morris, a leading Enterprise design engineer. In his original brake, for economy and simplicity in handling the much smaller volume of water involved, Morris used a series of drilled and plugged openings. It was in this application that the unusually stable operation was observed. Provision of sliding gates introduced the need for a hoisting unit, one that would operate the gates together and with a fine degree of control. The answer was a fractional horsepower motor mounted on the upper casing, powering a drum on which the wire hoist ropes are wound. Limit switches on the

Engine test data are recorded by complex instrumentation. This set-up includes special gear placed to check performance of Elliott turbocharger.

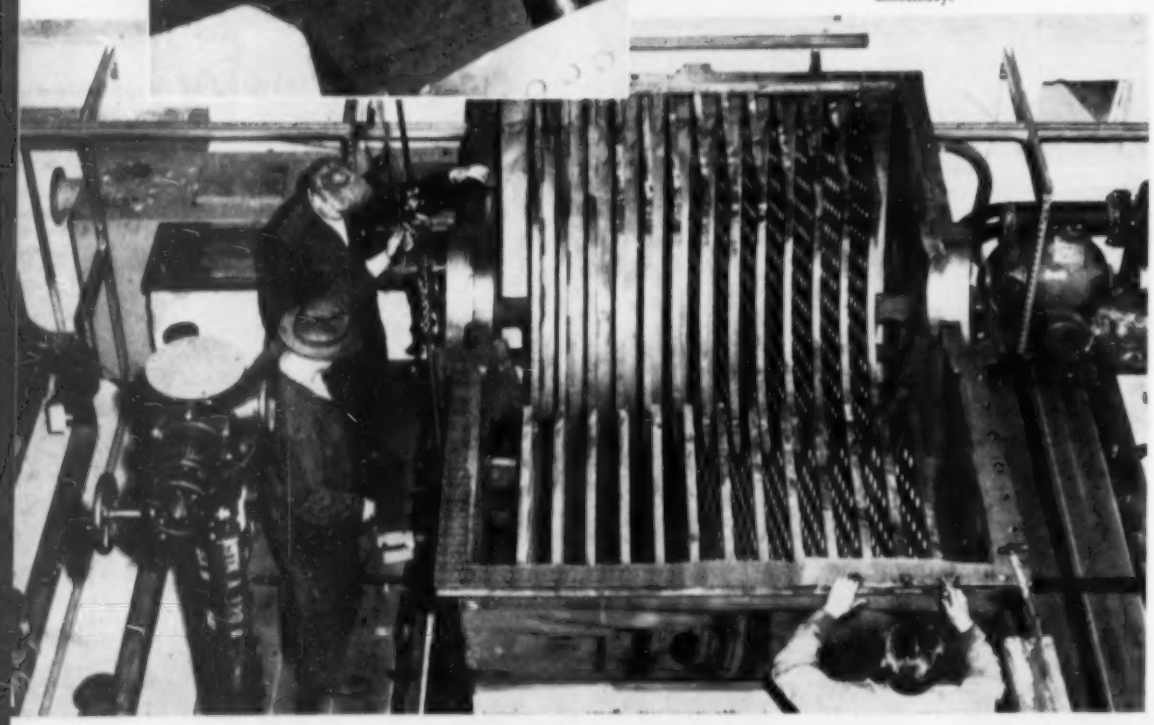


The cooling system includes these main facilities: a Marley tower for lube oil cooling water and Young radiators for dynamometer and engine jacket water.

many detailed decisions. For a starter, what about using buckets on rotor and stator? Enterprise decided this might be economical for a "production model" dynamometer, where the cost of patterns for bucket castings could be charged to several machines. But for this single installation there had to be a cheaper way. The answer was circular plates, drilled with many holes and assembled on the shaft and in the casing by welding. Flame cutting, drilling, and welding, the means of fabrication, would have been expensive on a quantity basis, but were the economical choice here. Rotor and stator dimensions show how the components of this brake are "off the scale" of normal materials. The rotor diameter is 9 ft., but 1¼-in. mild carbon steel plate is rolled only to 8-ft. width. A special mill order was the answer, handled by Enterprise's supplier, Joseph T. Ryerson & Son, Inc. The rotor consists of 12 circular plates, each flame cut to shape and drilled through with 384 3-in. holes, plus a centerbore drilled only roughly to size. The plates were separated in assembly by space rings 3¼ in. thick and 20 in. in diameter. Plates and spacers were welded up alternately in sequence to make the rotor. Then the centerbore was accurately machined for a press fit on the brake shaft.



In operation, the dynamometer is easy to control from central station. New Westinghouse control center is behind Q-series engine on test.



Setting bolts at dynamometer coupling completes linkage of stub shaft between new brake and first test engine.

Placing gasket on flange of lower casing, workmen prepare to set rotor and upper casing, which completed major assembly.

ropes prevent them winding the hoist ropes backwards on the drum.

Designing and building the dynamometer was one thing. Providing the spot for it, together with its necessary utilities and auxiliaries, was something else. To make the most of its capacity, an extensive new test stand was designed and built in one of the Enterprise plant bays. The installation includes a concrete-lined pit 76 ft. long and 22 ft. 4 in. wide, by 10 ft. deep. At its center there was excavated additional depth for the dynamometer sump, which is 12 ft. 9 in. deep below floor level. Including engine test stands that rise from the pit to floor level at either end of the dynamometer location, this pit takes in over 350 cu. yd. of concrete. Steel framing in the pit between the test stands and the sides of the pit supports removable floor plates. It also carries the piping for the lube oil circulating system, engine jacket water, dynamometer supply and return water, fuel and lube oil cooling water. Oil and water pumps and the full flow oil filter are also located below floor level, resulting in a completely uncluttered test area but at the same time assuring easy and fast access for repairs, maintenance, and alterations.

The cooling facilities are located on the roof above an adjoining plant bay, served by piping and circuits from the dynamometer test area. Lube oil cooling water circulates at 600 gpm. through a Marley cooling tower, while Young radiators are provided for dynamometer water and test engine jacket water. Flow rates in these systems are 800 gpm., and 1,000 gpm., respectively. With the dynamometer swung from its trunnions, another neat bit of design thinking is evident. To eliminate Brinelling of trunnion bearings, they must be rotated periodically. This becomes an unusual chore with a brake of this size, 90,000 pounds. The answer at Enterprise was a special solution, again. The outside diameter of the trunnion bearing carrier was machined with a toothed surface, and a pawl fitted to the trunnion stand, to engage the teeth. Linked to a threaded shank, the pawl can be adjusted in its position; but at all times it is snug against the toothed bearing surface. Periodic wrench adjustment of the pawl forces it forward, rotating the trunnion bearing carrier slightly. Over a length of time, the pawl reaches the limit of its adjustment. It is then retracted and set up snug against the next tooth in line.

Building of this dynamometer has been a project of John Sheusner, operations manager for Enterprise Engine & Machinery Co. The detailed design was supervised by Don Morris with many of the features drawn from experience with his earlier 26-in. dynamometer, also in use by Enterprise. Design engineer was Adair Roberts. Installation of the dynamometer and its auxiliaries, including planning and construction of the test stands and utilities pit, was under the direction of Fred Reibin, then plant engineer, and Frank Reeve, maintenance foreman. Early work with the machine, testing of a 1,755-hp. Q-series tri-fuel engine, has been directed by Bill Goodrick, test foreman of the company.

LIST OF EQUIPMENT

Engine jacket water system—Byron Jackson pump, Young radiator.

Lube oil system—De Laval pump, Hoffman full flow filter.

Lube oil cooling water system—Byron Jackson pump, Marley cooling tower.

Dynamometer water system—Byron Jackson pump, Young radiator, De Zurik control valve.

Scale—T. R. Mantes Co.

ALCO'S NEW DL 701 LOCOMOTIVE

by Arnold B. Newell

The new Alco All-Purpose locomotive. Power is from the new 1800 hp, Model 251, 12-cyl. V-type engine.

ANOTHER milestone on the road to diesel-electric locomotive advancement was set in February when Alco Products, Inc. announced and displayed publicly the new DL-701 road-switching locomotive powered by their new 251 vee-type 12-cylinder turbocharged diesel engine rated at 1800 hp for traction. Like the locomotive, the engine is entirely new in many respects and of simpler design than earlier models.

The unveiling was attended by representatives of more than 25 of the nation's big railroads and some 40 members of the press and the magazines of the country. It was held at the Schenectady works which is one of seven Alco plants in various parts of the country producing locomotives and other products. This oldest of locomotive builders in the United States is also affiliated with the Montreal Locomotive Works, Limited in Canada.

Of extremely versatile design, the DL-701 can be used in freight or fast passenger service on the main line or as a yard switcher. To this end certain gearing modifications are available to meet customer specifications. For example, geared at 65 mph the continuous tractive effort is 53,000 pounds; at 75 mph this figure becomes 46,500 pounds, and at 80 mph it is 43,400 pounds, and finally, at 92 mph, which is the maximum gearing offered, the continuous tractive effort is 38,000 pounds. In exterior appearance the DL-701 has a distinctive high hood line and angle number boards. The cab is insulated and weatherproof, and is roomier than has been true of earlier models. It has two fresh-air intake heaters for cold weather comfort. Dial-type gauges are conveniently located to permit easy operation of the unit in either direction.

The physical characteristics of the locomotive provide some data of interest. It is 14′ 6″ high, 10′ 1⅝″ wide, and 56′ 11¾″ long inside the knuckles. The base weight is 240,000 pounds. It can be ballasted to 260,000 pounds. The wheel base of each truck is 9′ 4″, and the wheels are 40″ in diameter. Wheel base of the locomotive is 40′ 4″. Roller bearing trucks and a rubber draft gear are standard equipment. Available is a dynamic braking system of the highest capacity usable which has a new blower motor circuit that insures against grid damage due to loss of air during wheel slip. Steam generators are available in capacities of 1600, 2750, and 3500 pounds. When a boiler is not used, the fuel capacity can be as high as 2600 gallons on the DL-701. Although the diesel engine is the prime mover, we will touch upon that last, for its presence will be felt in marine and industrial, municipal, utility and petroleum industry services, as well as on the railroads.

In general, the electrical system is conventional, but there are some improvements of considerable interest. The basic electric controls include a simplified engine control with individual push-button start and stop, and a simple, two-position, engine-control switch with idle or isolation and run positions. There is a fuel-rate control in which the governor provides timed rate of fuel advance for throttle-cushioned duty on the engine and cleaner exhaust during acceleration. This permits putting the engine on line in transit. There has been a substantial reduction in the number of relays leaving heavy-duty tamper-proof relays when required. There is a new heavy-duty ground relay with a trip signal and reset button accessible in the cab without opening compartment doors. Terminal boards have replaced nearly all of the amphenol connectors, thus saving maintenance time by reducing the number of soldered connections. Improved versatol neoprene-jacketed rubber insulation is used on all wires and cables which are wireway installed.

For maximum reliability and low maintenance cost, there is a static excitation system employing only one rotating machine, a three-phase alternator with two slip rings and no commutator. It has inherent control of horsepower, voltage and tractive effort. The system's static control is contained in four blank front interchangable panels which may be quickly checked and replaced without delay if found defective.

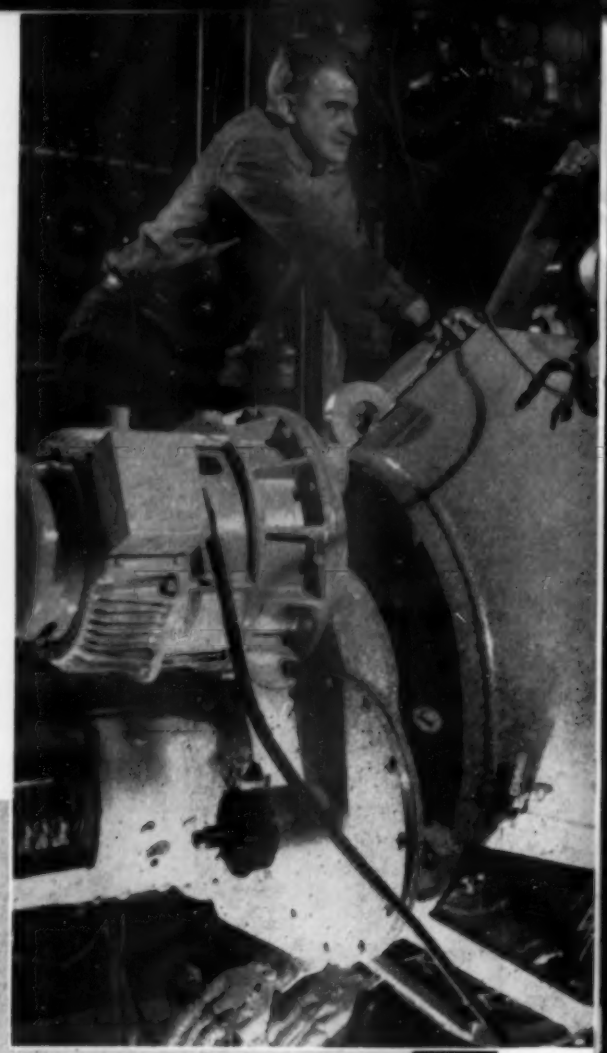
The new Model 251 diesel engine and the General Electric generator which make up the power unit combine in a manner to provide very compact

power at moderate weight. This engine will prove to be of interest to men in many industries. The 12-cylinder model on the DL-701 is rated at 1800 hp for traction. This model engine is also available in 6 and 16 cylinders which would have a rating of 900 and 2400 hp, respectively, for traction.

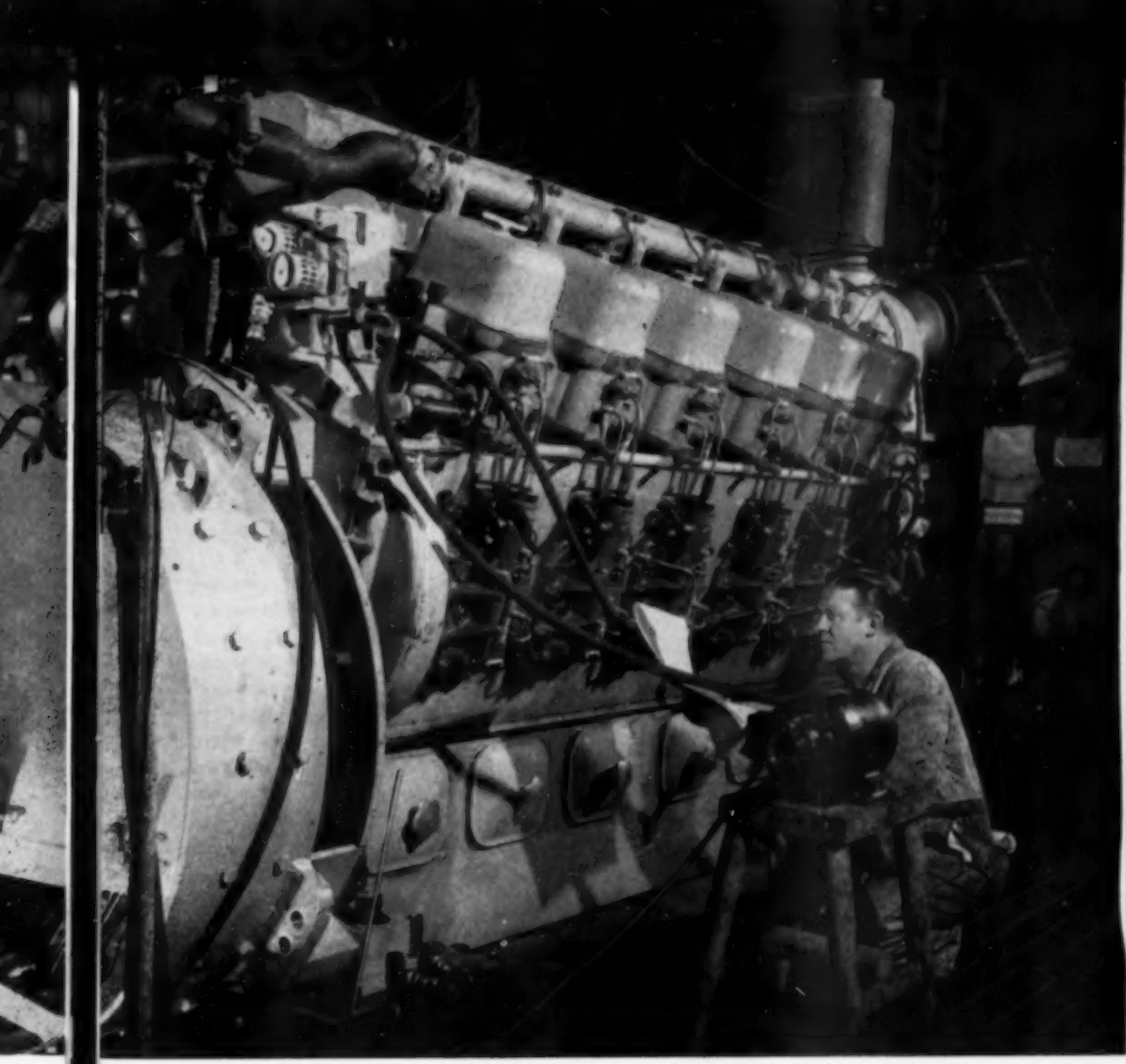
It is a 4-cycle, vee-type with block and base of heavy steel weldments. Diesels produced by Alco and its predecessor companies have been used in many industries. For example, they pioneered in marine propulsion service on all classes of ships and in stationary applications of all kinds at home and abroad. Alco Products, Inc. with its diesels alone is active in oil-well drilling, pipe-line pumping, municipal power and many other fields. Therefore, an advanced model will find interested observers in many places.

The new model eliminates the free-end casing, camshaft idler gears and camshaft casing, water jackets and generator adaptor used on the Alco Model 244. The 251 is turbocharged with an Alco turbocharger and has a Moline aftercooler effectively lowering temperatures in all combustion-affected areas. To decrease wear, all working parts on the new engine are totally enclosed. With a new fuel-injection system, improved combustion has been achieved and the benefit of a dilution-proof operation is included. It is the belief of the Alco engineers that cylinder liner and valve life have been materially improved through use of valve-seat inserts and hardened valve faces. Piston ring longevity is anticipated because a Ni-Resist piston insert is used, and the piston rings are heat treated to make them more compatible to the chrome-plated cylinder liners.

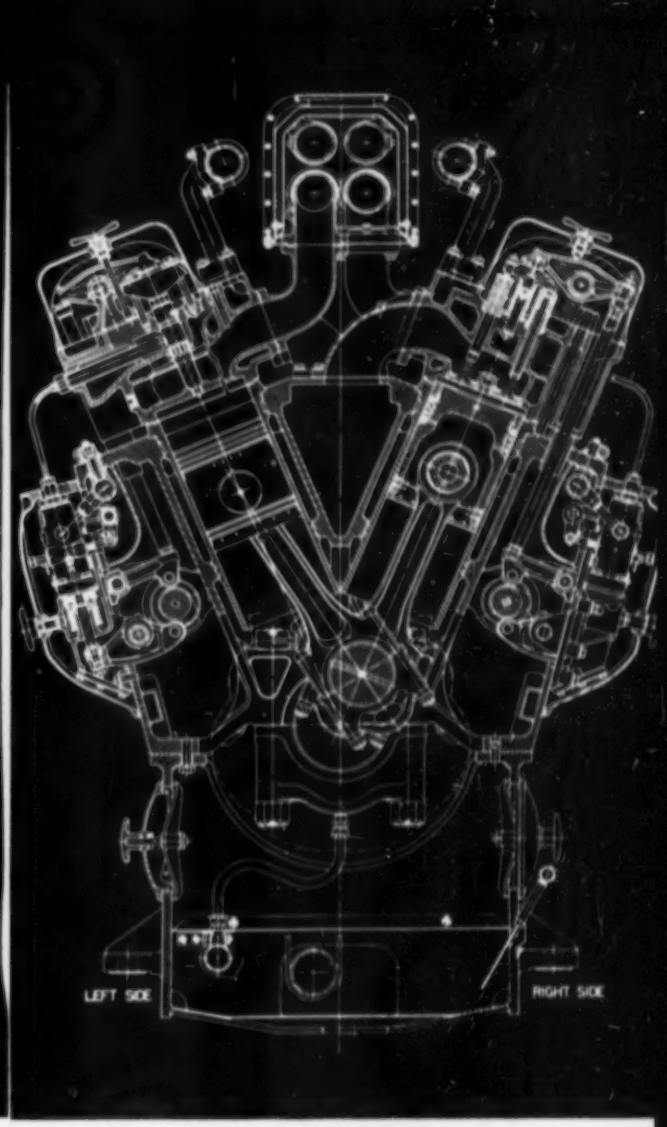
Compared to the 244 engine, the cylinder block of the new engine is stronger and heavier and there is a wider and stronger center main bearing with serrated fit between all main bearing caps and saddles. Precision main and con-rod bearings are grooveless and it is estimated that the oil-film thickness is double that of earlier design. There is a mechanical overspeed trip of positive action de-



A freight conductor waves in salute to the fireman as the DL-701 road switcher overtakes him.



The Model 251 Alco diesel on the test stand. The engine is run a minimum of nine hours under close inspection.



Cross-section through the V-251 engine looking from the generator end.

sign to improve the over-all safety of the new model. So much for generalities. An inspection of the complete engine in the locomotive and the parts on display and a visit to the shops where it is built and tested takes the observer into the realm of functional design and engineering beauty which is distinctly more than "skin deep." In the welded steel block, we find skillful utilization of every cubic centimeter of space. In the accompanying illustration of the base block, we see that each camshaft carries a large gear meshing directly with the smaller one on the crankshaft, and the bearings are inside the main structure. This, in turn, places the camshaft close to the cylinder for snug push-rod operation of the valve mechanism while placing the individual American Bosch fuel-injection pumps close for compact drive and yet fully accessible from the exterior. Extreme simplicity is noted in the manner of inserting the cylinder liner designed in a way to bring about active circulation of the coolant and to eliminate the danger of hot pockets in the engine.

The cylinder head and the piston are designed as a single unit for maximum combustion efficiency. The combustion space at peak compression is disc-shaped. The area is symmetrical. There are four valves in the head and two are inlet valves, one of which admits air in a manner to bring about rotating turbulence while the injection spray pattern is flat. This spray pattern occupies the hub of the space, and air under compression rotates around it, thus feeding the flame to a clean, fully-consumed state by the time the exhaust period begins. This correlation of cylinder head and piston crown, slightly dished, accounts for the nearly smokeless acceleration and clean exhaust under way. The piston and rod assembly are more narrow than the cylinder bore, allowing for changeout intact after removal of cylinder head without removing the cylinder liner.

The pistons are cooled with oil taken through the wrist pin from the lubrication system and spilled back to the crankcase through an opening in the boss near one end of the wrist pin. The route of circulation is into the most critical areas.

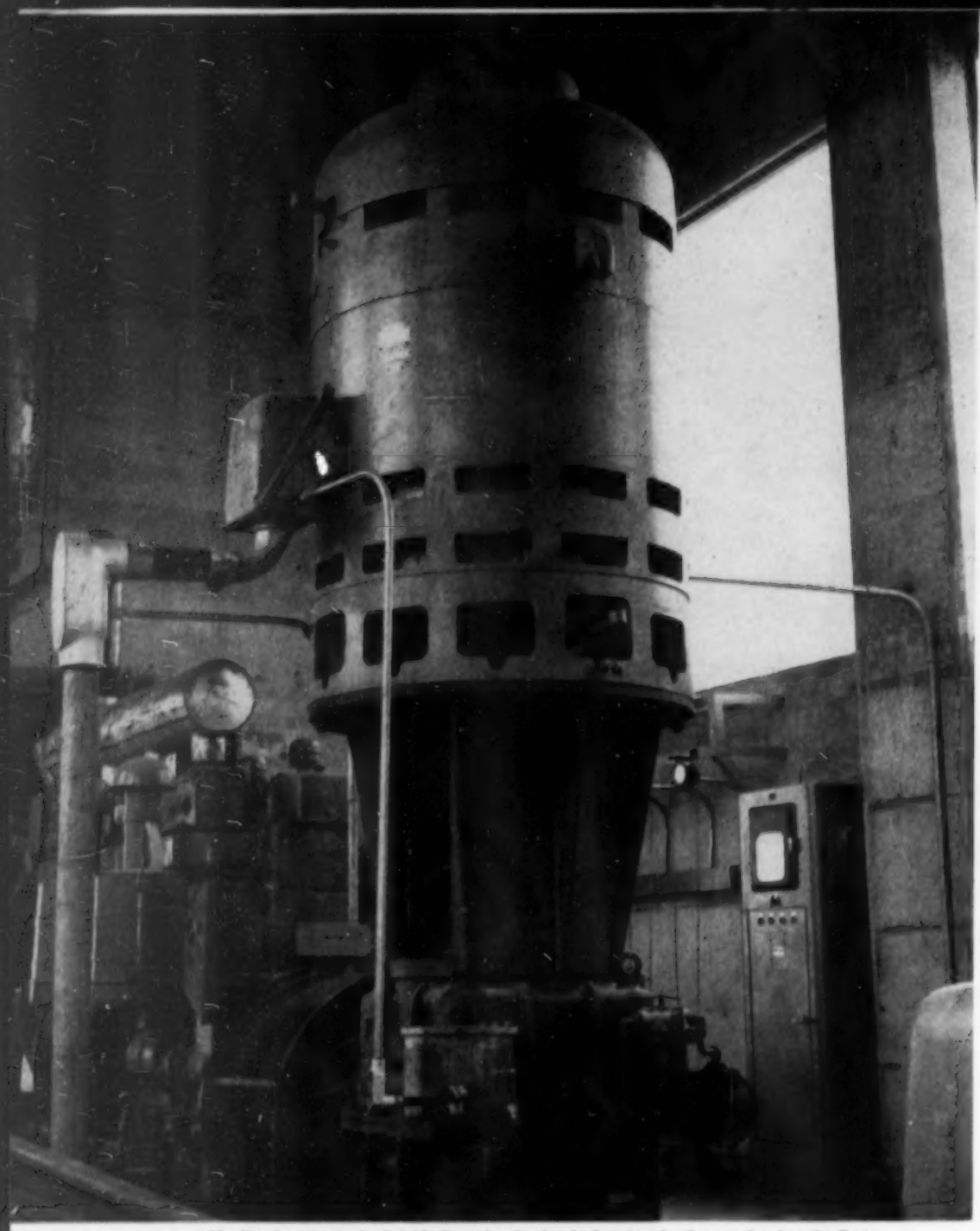
An extra wide center bearing with a double set of bolts holding down the cap is the centering element preventing end drift of the crankshaft and also providing the extra bearing surface needed at the place where the bearing burden is greatest. The crankshaft, which is counterweighted, is equipped with a Houdaille vibration dampener to subdue torsionals. Every working part is within the pressure lubrication system. On the front end of the engine there is a centrifugal-type water-circulation pump by the Morris Machine Works. The direct displacement Roper pump for lube oil is mounted on the front end of the engine. Oil is first passed through a Nugent filter and then through an American Bosch final stage filter before entering the fuel-injection pumps.

Items of general interest throughout are worthy of mention. They include Moline aftercooler between turbocharger and engine, Young Radiator cab heaters, Aeroquip flexible tubing throughout, air compressor by Westinghouse Air Brake Company, and the entire electrical system, including generators, by General Electric Company.

The trucks are the same four-wheel, swing-motion, fully-equalized, swivel-type which have been so outstanding in performance on Alco's 1600-hp road switcher and freight locomotives. There are many modifications which can be applied. These include the oil-bath filter and hump control applications, which have been applied on the prototype model. In general, all of the outstanding features of other Alco units have been included in this design, as well as many improvements developed as a result of Alco's years of locomotive experience.

List of Equipment

Engine—12-cyl., 4-cycle, V-type, 1800 hp, Alco.
Final stage fuel oil filter—American Bosch.
Fuel pump and Injection system, American Bosch.
Aftercooler—Modine.
Heaters for cab—Young Radiator.
Lube oil pump—Roper.
Flexible tubing—Aeroquip.
Pressure filter—Nugent.
Lube oil strainer—Nugent.
Air compressor—Westinghouse Air Brake.
Vibration dampener on crankshaft—Houdaille Industries.



The No. 1 pump at the Seaside Pumping Station in Los Angeles County showing the Buda diesel and the Custom Built automatic controls at lower right corner.

DIESELIZED "AUTOMATED" PUMP STATION FOR FLOOD CONTROL

By JAMES JOSEPH

FOR Los Angeles County, which remembers well the watery havoc of 1938, the now-abuilding Seaside pump station in Long Beach is a hedge against heavy rains and possible disaster. Ostensively it's a "lock and key" installation. For, though a district superintendent will visit the station daily, it is keyed to 30-day operation, with no full-time operator. And that's about as close as engineering comes to diesel automation.

Station's primary job is to lift storm waters from a mile-square south Long Beach residential area, boost them over a 16-ft. high levee, discharging into the Los Angeles River Flood Control Channel from where water gravity-flows the short distance to the Pacific. Seaside, approved by a 1952 bond issue, is first of a projected 5 pump stations. And, like those to follow, it'll operate semi-unattended, its three major turbine pumps, auxiliary diesel and valves automatically actuated. Pump house is of concrete slab construction, 80-ft. long, 24-ft. wide and 25-ft. high, the structure set on 173 piles driven to 20-tons bearing. Interiorly, the station is served by an overhead 5-ton crane.

Ten times monthly the station's single, 275-hp Buda diesel will test-run itself, monitored by Custom Built Controls, the operation recorded on a Bristol 30-day chart. Just as automatic are the installation's three deep-well turbine pumps, working a 25-ft. head and rated 33,000 gpm. Floats in storm water sumps trigger Mercoid switches, powering pumps and also the diesel. A fourth and smaller pump, with 1200 gpm capacity, works a 34-ft. dynamic head, its primary function the draining of the station's deepest sump area which bottoms some 37-ft. below the pump house floor. Storm waters collected by under-street catch basins (typical: concrete boxes, 3-ft. deep and about 3.5-ft. long, with curb inlets) shunt to Seaside's 78-in. dia. inlet.

Cross-sectionally, the station has two operating levels: (1) the pump-house proper, its operational floor, electric pump motors and diesel; (2) a cavernous, underfloor concrete pit, reaching a maximum depth of 37-ft., its walls 16-inches thick and heavily reinforced. Storm waters entering the 78-inch inlet are strained through a trash barrier (closely-placed 2x12-inch redwood baffles), then to the deeper underfloor sump. Working the sump are three primary pumps (all of them Cascade). A Dresser coupling take-off from each pump's suction line feeds to 36-inch dia. reinforced concrete pipe. The take-off comes at the plus-1.75-ft. level. The three concrete conduits exit the pump house, climb 45-ft. to the levee's top at the plus-16-ft. level, and discharge into the Los Angeles River Flood Control Channel. The smaller sump-draining unit has an 8-inch dia. discharge, likewise to the river.

The Buda diesel is strategic to the station's automation and for good reason. Logically, the station's greatest need comes during and immediately following severe storms. Yet this is precisely the time when power outages are most likely. Thus, the Buda is coupled to one of the large, 33,000 gpm turbine pumps. Custom Built controls assure that the engine will start up when sump levels rise and power fails. The Buda is a Model 8-DC-2505, with 2505-cu. inch displacement. It's a four cycle engine with 6¾-inch bore, a stroke of 8¾-inch, rated 275 bhp at a maximum 1050 rpm, and significantly, it can idle under no load at from 450-500 rpm.

Ability to idle at low rpm is important. First, because the diesel is coupled to its pump via a centrifugal clutch. The clutch is the spring-controlled type, capable of transmitting the engine's full 275-hp at 1050 rpms. But just as important, the clutch doesn't engage until engine rpms build to between 650-700. Thus, for the 10-times a month test-runs, the engine operates, as it must, independently. The reason is noteworthy. During most test-runs the station's sump will be empty or very nearly so. For the station operates only during storm water run-offs, and in California, generally, rains come only during winter. Engine or pump burn-out would result should the engine-pump work a dry sump. So, for the tests, and during low-sump conditions, the engine test-runs on idle, disconnected from the turbine pump.

This important stipulation taxed the circuitry and adjustment of the Custom Built Controls, made them doubly crucial. Normally, during low-sump level, the engine test-runs at between 450-475 rpms, idling perhaps as high as 525 rpms, but no higher.

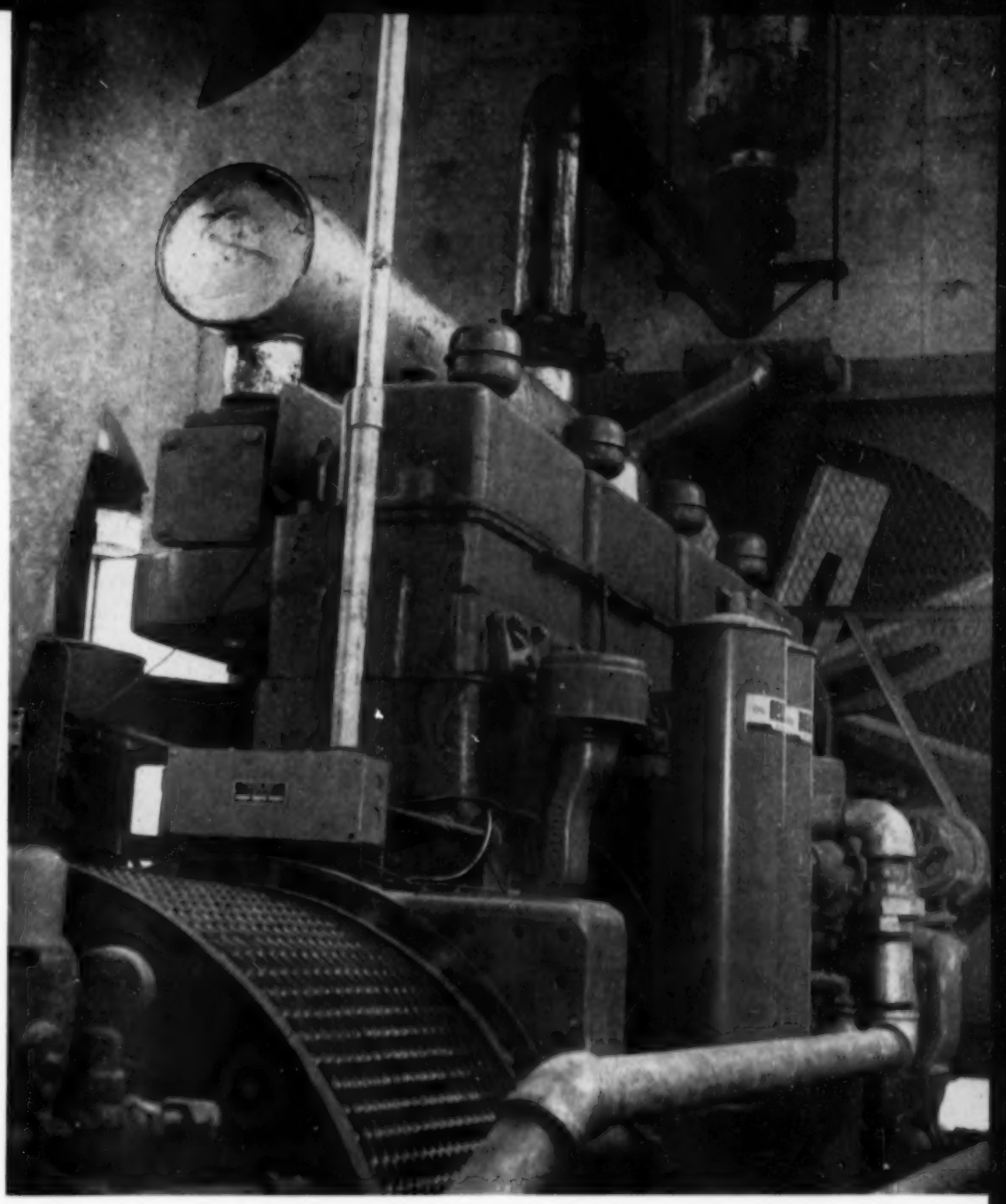
Only when the engine is automatically cut-in—comes a power failure plus high sump level—do rpms increase to full speed, 1050 rpms. And, as the 650-700 rpm point is reached, the centrifugal clutch throws in, tying engine to its pump. Five float-switch wells and their associated but independent Mercoid switches, trigger "power on" circuits for the four pumps and diesel engine. When the diesel's operating, its pump's electric motor is automatically "blocked out" and shut down.

The Buda diesel auxiliary stand-by: the engine's installed with an electrical generator and starting motor, both operated by 32 volts dc. Start-up power comes from four, 8-volt Clarite batteries, with minimum capacity of 200 ampere hours at a 20-minute rate. Batteries are tied to a Lester trickle charger, capable of fully charging them at a 24-hour rate, then switching to trickle when full charge has been reached. A 46-inch dia., 12-ft. long, 1000-gallon capacity diesel fuel tank, its exterior tar-coated, is housed underground along the pump station's east side. Go and return lines from fuel oil storage to engine are ⅝-inch O.D. copper.

Along the south wall is an automatic shutter, its blades gravity operated by the engine's radiator. Normally shutters remain closed. They're opened only at engine start-up, and then by radiator air pressure. A rectangular transition duct connects radiator and shutter. Engine's exhaust manifold connects to a 5-inch dia. exhaust header. The exhaust line from pump-house floor to a height of 7-ft. is sheathed in 2-inch thick, 85 per cent magnesia high temperature insulation. Silencer is a Kittell. Immersion heaters maintain lube oil and jacket water at operational temperatures.

Cascade deep-well turbine pumps: the three main Cascade pumps are identical, save for #1 pump which ties via special gearing to the auxiliary diesel. In general, pumps are the vertical shaft, mixed flow, bottom suction type, rated 33,000 gpm and directly connected to General Electric 300 hp induction motors. The smaller 1200 gpm sump-drain pump is directly coupled to a 15 hp GE motor. Motors for primary pumps are equipped with four 1000-watt, 240-volt electric strip heaters. The smaller pump has two 150-watt heaters. Pump #1's combination gear drive is a Philadelphia Gear Works type SBVX.

Automatic Engine Controls: the Custom Built controller has some five functions: (1) start up engine in times of power failure and high-sump level; (2) indicate failure of engine to start by automatic controller; (3) warn of high jacket-water temperature (in excess of 185-degrees F.); (4) warn of low lube oil pressure (if engine's lube pressure drops below safe limit for a period of 15-seconds); (5) warn of engine overspeed, and shut diesel down (if rpms exceed 1200 rpms). Ten times monthly the unit automatically starts up the engine, runs it for a preset period (anywhere from 1 to 30 minutes, dependent upon setting). During tests the engine indles at a maximum 525 rpms. Run is recorded, monitored by the Bristol chart which in turn is linked to an electric program clock on the Custom Built panel. Should something go wrong, warning lights flash, an alarm sounds, and the engine is automatically shut down.



The Model 8-DC-2505 Buda diesel rated 275 bhp maximum which is geared to the No. 1 Cascade pump. Note the Custom Built Controls (box at driving end of engine) and the DeLuxe filters.

Control unit, actuated by a combination of power failure, float switch or test run, begins the cranking cycle (five positive cranks, four positive rests). Cranks and rests are adjustable from 5 to 60-seconds duration each. At moment of cycling, a solenoid triggers to operation the sight feed lubricator on #1 pump. Another energizes the engine governor, either for full or idle. Should the engine be on test during a storm, and should a power outage combined with rising sump level call for immediate emergency full operation, this latter condition takes precedence, automatically upping rpms from test-run to idle to full speed.

From all this, it's obvious that Seaside pump station is an "automated" installation, needing but periodic checking, and comes as close as engineering allows to pumping automation.

The project is a joint venture of Stolts, Inc., and Morrison-Knudsen Co., Inc. Project superintendent is Joseph Kubich. Harry Davis is area supervisors for the Los Angeles County Flood District, which will operate the station. James R. Bole was consulting engineer. Design was under direction of Jess Gilkerson, City Engineer, Long Beach. G. W. Outland was assistant chief design engineer for the district.

List of Equipment

Diesel engine—Buda.
Start-Run Controls—Custom Built.
Heat Exchangers—Ross.
Injection System—American Bosch.
Lube Oil Filters—Cuno.
Silencer—Kittell.
Generator Regulator—Delco-Remy.
Filters—Deluxe.
Float Switches—Mercoid.
Pumps—Cascade.
Pump Motors—General Electric.
Combination Gear Drive (#1 Pump)—Philadelphia Gear Works, Inc.

GAS COMPRESSOR STATION POWERED BY NORDBERG

By MICHAEL T. PATE

TRANSCONTINENTAL Gas Pipe Line Corporation has placed in service its Station No. 23, located some 25 miles northwest of the company's home office in Houston, Texas. This newest station on the natural gas pipeline stretching from near the Rio Grande Valley deep in South Texas to New York City incorporates a design feature which is now commanding special attention from pipeline engineers. The station is powered by a 16-cylinder, 4-cycle, V-type gas engine, driving a centrifugal compressor or blower through a speed-increasing gear.

The engine is a Nordberg, Type FSE-1316-HSC, with 16 cylinders, 13-inch bore by 16½-inch stroke, rated to deliver 3000 hp. at 470 rpm. The engine is mounted on a monolithic concrete base, approximately centrally of the building housing the complete compression unit. There is no firewall or other partition between engine and compressor. A flexible coupling connects the engine to the 10:1 speed increaser to provide a compressor shaft speed of 4700 rpm. with a single set of gears. The gear box is of Nordberg design, with the bearings slung from the upper half of the case, the gears cut by Farrel-Birmingham to provide the double herringbone pattern. A second flexible coupling ties the gear box output shaft to the shaft of the De Laval centrifugal compressor, which is rated at 6910 cu. ft./min. with a designed suction pressure of 620 psig and discharge of 702 psig. Temperature for this rating is based at 60°F.

The engine is equipped with two American Bosch pulse generators to provide ignition. Fuel gas, drawn from the line throughout, is reduced from the high line pressure to the required pressure through two sets of regulators, provided in pairs so that switch can be made to stand-by units instantly in case of stoppage or derangement at one set of units. The intake air, taken high on the outside of the building to avoid as much dust as possible, is drawn through a specially designed filter, and passes through a pulsation dampener before entering the intake side of the De Laval turbocharger. On leaving the turbocharger at a temperature of about 150° F. the air is forced through an intercooler, where its temperature is reduced to about 100° F. before entering the intake manifold. The exhaust jacketing is carried from the engine to and through the station-building wall to the point where the horizontal run enters the vertically mounted exhaust silencer. It was especially noticeable that none of the air intake system, as well as that of the exhaust, presented any noise which could be detected above the normal running of the engine or compressor.

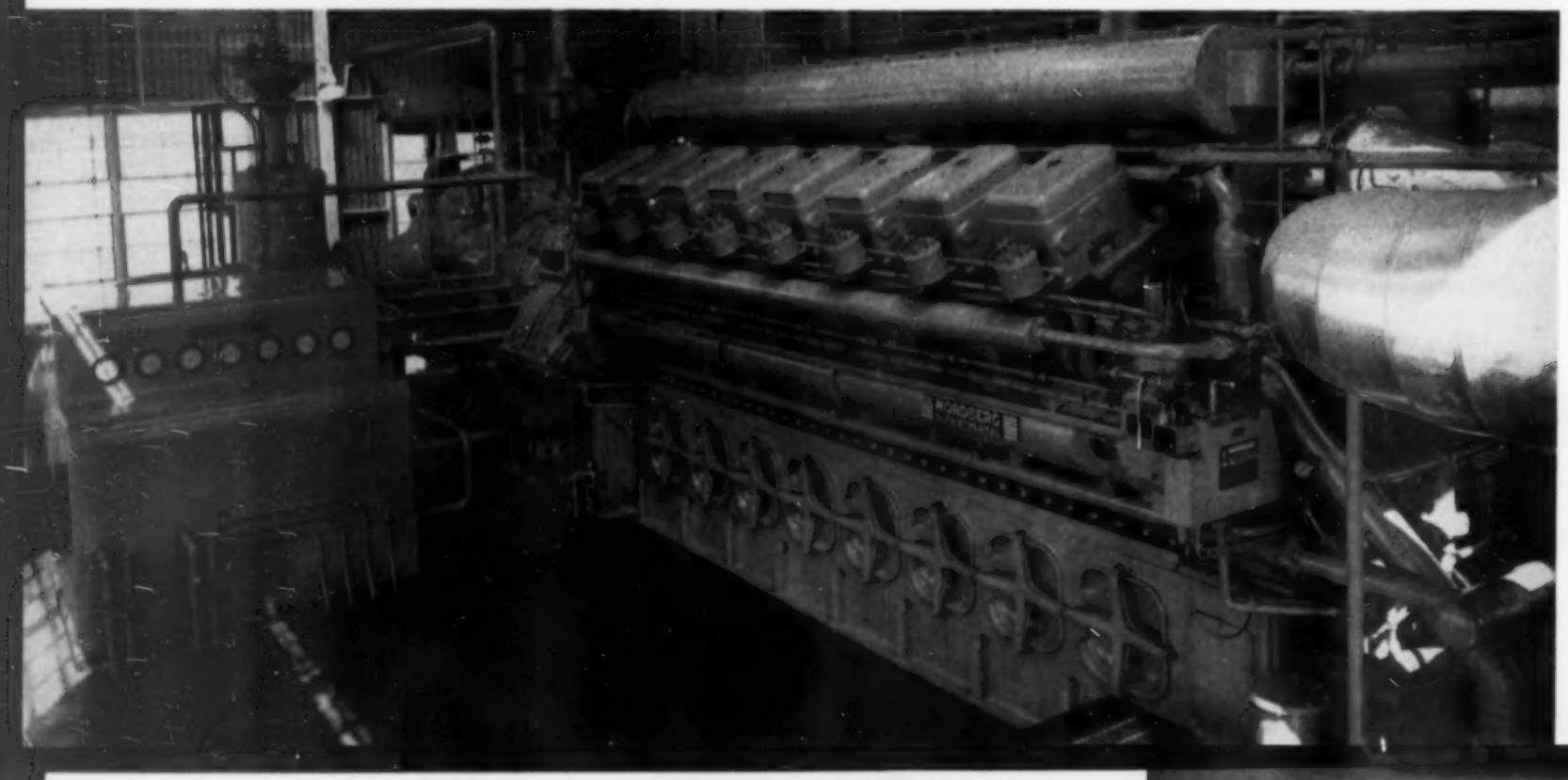
The engine is equipped with automatic controls throughout, being designed for unattended operation, as well as to develop required power over a wide range of trunkline gas suction and discharge pressures. Safeguards are provided on all gear bearings, as well as at points on the various cooling water systems, so that the unit is automatically shut down in case of overheating, oil or water failure, or excessive speed. An Alnor pyrometer mounted on the panel provides for checking temperatures at any exhaust valve; while a second Alnor, connected into the exhaust manifold, provides an accurate reading of the combined exhaust temperature before and after the turbocharger.

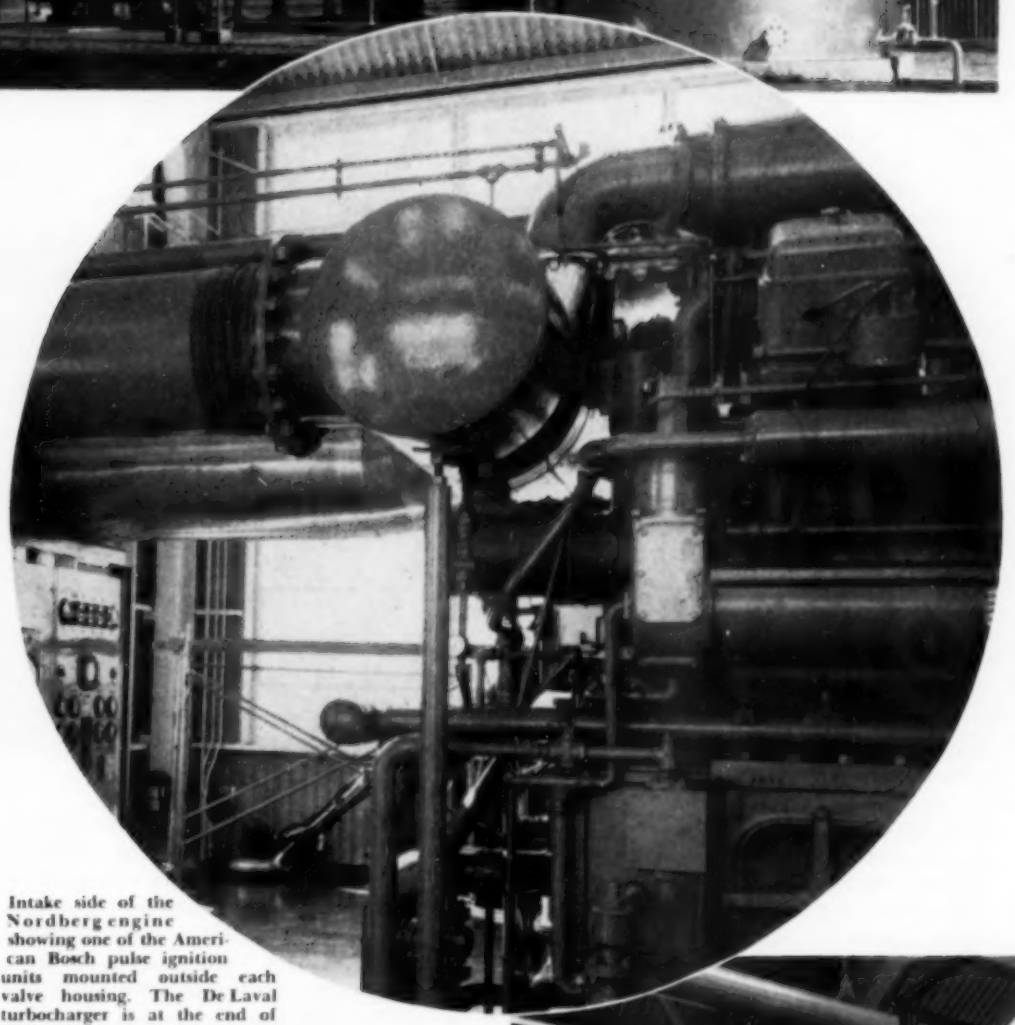
The main compressor building at the left with silencer and air intake filter in front. The two horizontal tanks for starting air, the two-unit Degree cooling unit and the make-up water storage tank follow from left to right.

A two-section fan-type cooling unit is mounted in the station yards with separate piping to each of the cells. One section handles jacket cooling water, with the fan speed adjustable to provide the required heat removal as required by the ambient temperature. The second section carries the water to cool the intake intercooler, turbocharger oil and gear case oil, each with its separate thermostatic control to maintain the desired temperature gradient. Crankcase oil is cooled in a heat exchanger, mounted in the station basement alongside the engine foundation. Water from the exchanger is also pumped through the second section of the cooling system. Twin strainers are set in the oil line just after the heat exchanger so as to strain all the oil as it enters the crankcase. Also set in the basement are the motor and pump combination units which pump the various flows of cooling water. Each unit is flanked by a stand-by of equal capacity, so that the load can be taken over by the stand-by in case of shut down or impairment of any function of the unit previously carrying the load.

Twin air compressors, each driven by an electric

Exhaust side of the Nordberg 16-cyl., 3000 hp. engine. Platform for manual-starting is at lower right. Console for De Laval compressor is at left with one of the 24-in. WKM valves with compressor body in the background. Note the American Bosch pulse ignition units at the side of each cylinder. The oil filter unit is a Peco made by Perry Filter and lube oil cooler is by Ross.





Intake side of the Nordberg engine showing one of the American Bosch pulse ignition units mounted outside each valve housing. The De Laval turbocharger is at the end of the intake header with pulsation dampener supported in the standard at corner of the engine.

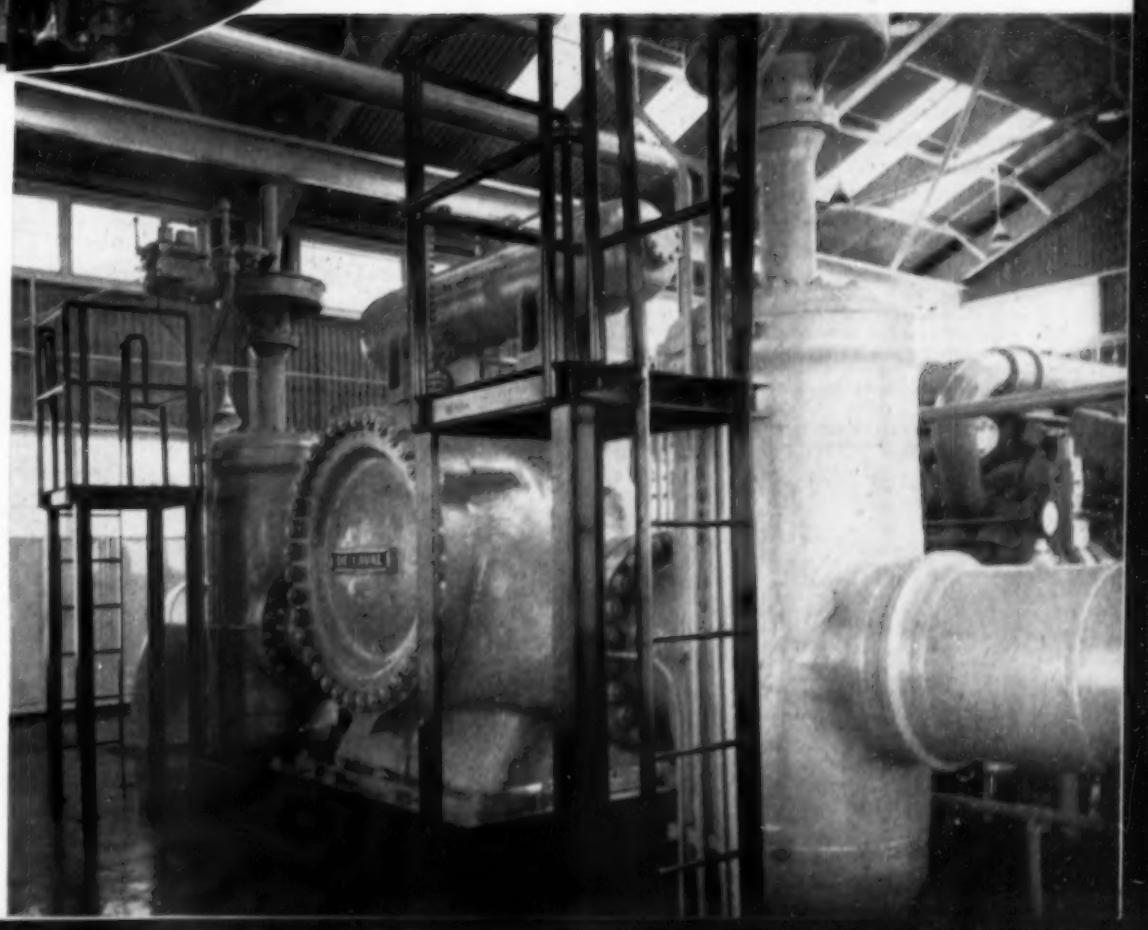
motor, provide starting air, which is stored in parallel, horizontal tanks located in the station yard to one side of the cooling unit. This air also powers the barring jack, used in engine maintenance. A control panel, divided into the major section set at the head end of the engine and the other located along the station wall at right angles to the first, provide mounting for all stop-and-start circuits, indicator lights in the alarm circuit gauge mountings, tachometer dial, the pressure recorder and the recording thermometer, and auxiliary equipment. A panel in the station office building houses all electrical control equipment, including Control suction and discharge pressure transmitters, starters and ITE current breakers. A storage battery, mounted along one wall of the room, provides emergency power.

Current for operating the panel boards, as well as for driving all auxiliaries such as pumps, water well, and lighting, is purchased from a public utility system, the station itself containing no generating equipment.

Lube oil storage is in an elevated, outdoor tank. The oil passes through a filter in a side-stream circulating oil system. Special oils, such as for the gear case and compressor, are used from drums directly into the units for which they are bought. A tank serves as storage of make-up water for the various cooling systems, as well as for the office and personnel houses. Water is pumped from a well drilled in the station yard into the tank. Centrifugal pumps in the basement of the main building provide additional water pressure as required. Gas enters the station yard through a take-off at a block gate on the main line, passes through a scrubber before reaching the compressor intake piping—as well as the branch line to the regulator station for engine fuel—and leaves the station through a 30-inch check, set in the straight pipe run before the line makes the first of the two 90-degree bends necessary to take the gas back to the main line just beyond the block gate. Two 24-inch valves control the gas flow at either side of the compressor, being equipped to operate either for power or manual closing.

The station is complete with a warehouse, separate water-treating and meter houses, an office building, and two houses for the men in attendance at the station. The operators are within hearing distance of the warning horn which is connected into the warning system monitoring all the safeguard devices on the engine, compressor and auxiliaries. An air horn, mounted in the main compressor building, is tied in with the telephone circuit connecting the station wth the dispatcher's office in Houston, so that the operator may be summoned in case he is in the compressor building instead of being in the office.

The De Laval compressor with one of the 15-ft. W-K-M gas valves. The Massey governor on the Nordberg engine can be seen at the rear right.



CANADIAN PACIFIC GOES DIESEL

Part II

By CHARLES F. A. MANN

IN PART I of this series we outlined the major features of the diesel program on the CPR, based on a 5-year progressive changeover at a cost of around $75,000,000 beginning in 1951. Part and parcel of the changeover was the climaxing in 1955 of a 3-man management team of Canada's top diesel railroaders, who went up the ladder to head the world's greatest privately owned transportation system. Headed by President N. R. Crump, vice president David Thomson and operating vice president R. A. Emerson, the CPR heads for greater achievement in transportation economics and performance than ever before in its history. The sprawling System that reaches from Halifax and Saint John, to Vancouver and Victoria—nearly 3800 miles, progressively, since 1948 has picked off its worst steam powered areas and dieselized, thoroughly and with startling results.

Beginning with the Vancouver Island E & N subsidiary, then the Montreal-Wells River, the rough Schrieber Division straddling the main line around Lake Superior, both transcontinental routes West of Alberta to Vancouver, the Montreal-Detroit "name" freight and passenger trains and finally, with grand railroad gesture unparallelled in North American railroad history, in 1954-1955 re-equipped and dieselized the 15 heavy transcontinental trains making up the older "Dominion" and brand new faster "Canadian."

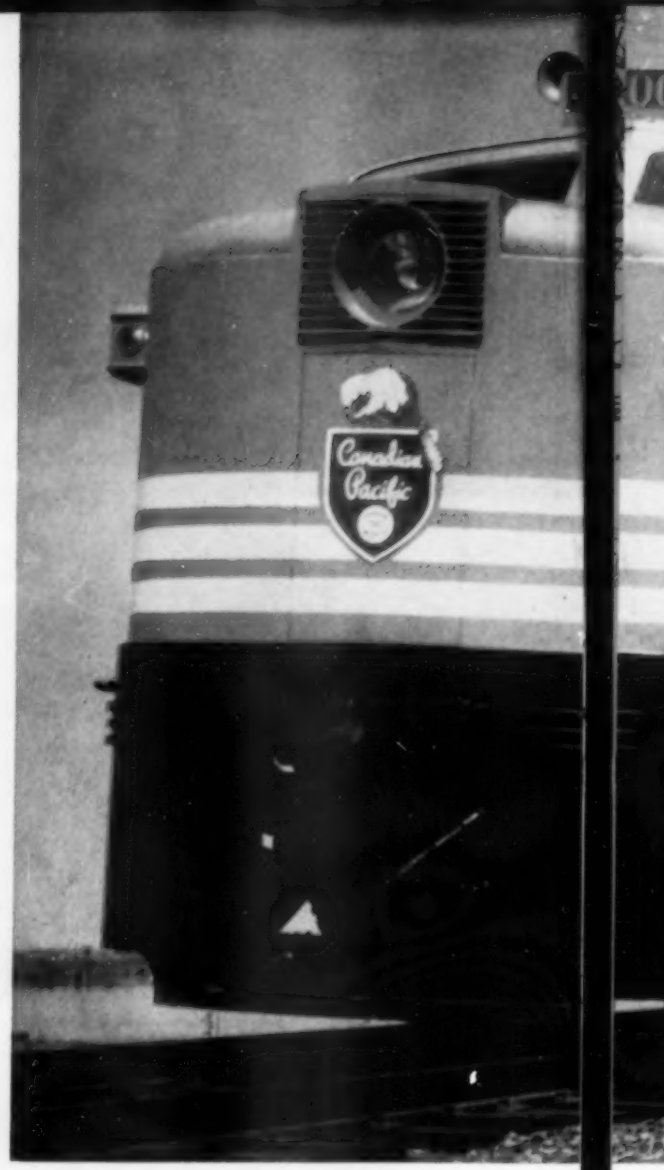
Topping the 5-year diesel program was the purchase of 173 streamlined stainless steel passenger cars of 7 basic types, at a cost of (not included in $75,000,000 dieselization cost.) $40,000,000 from the Budd Mfg. Co. of Philadelphia in 1954-1955, the majority of which went to completely re-equipping the two world famed transcontinental trains. Over $7,000,000 of the purchase price was spent in Canada for Canadian built equipment items and furnishings that were shipped across the border to the Budd plant for inclusion in the huge car order, a fact that CPR is mighty proud of.

And for 1956 there are 88 diesel units, on order for a total of 151,000 hp, including 30 of the sensational Fairbanks-Morse 2400 hp. Trainmaster units, supplied by the Canadian Locomotive Co.

Because of the tremendous geographical spread of the Canadian Pacific, embracing every type of climate and topography, except bare desert and coastal swamps, it is well to take section by section of the diesel program. This part of our series will cover the Schreiber and Prairie areas; the transcontinental passenger dieselization and highlights of the eastern activities and the new St. Luc (Montreal) diesel shop.

Because of its great spread and the sheer magnitude of the investment involved, the new streamliner, the "Canadian," ranks as one of Canada's major passenger train accomplishments. Instead of confining their thinking to the current "Buy Canadian" complex rampant in the press and in certain political areas, the Canadian Pacific boldly set out to create a totally new train for Canada, and sought out the type of equipment proved on U.S. railroads that would meet its stringent requirements for beauty, comfort, long life and economical operation. It chose the Budd car designs over all else, and placed one of the biggest single car orders in history with this American firm.

Of the 173 car order, 77 of them were selected into a group of 7 full trains, which are needed to maintain daily transcontinental service from Montreal to Vancouver and the connecting portion from Toronto, which joins the Montreal train at Sudbury. For each of the 7 train sets of 14 cars each, three rebuilt and lightened tourist sleepers were made up in the Angus shops, Montreal. Each new streamlined "Canadian" now consists of a baggage-crews dormitory car; 3 tourist sleepers; 1 dome-coffee shop-coach; 1 sixty seat deluxe coach; 2 "Chateau" type sleepers; 4 "Manor" type sleepers; 1 diner and 1 dome-observation-lounge-sleeper.



Each of the new "Canadians" are pulled by 3-unit GM type FP diesel locomotives out of a pool of 53 GM closed-cab units that operate in a round-trip cycle of 5762 miles from Montreal to Vancouver, the world's longest diesel locomotive run. Further, the older and famed "Dominion," was largely re-equipped in the form of 8 complete trains, on similar lines, but with more baggage and express cars.

This train continues on its former schedule and by changing the operating practice of running a Toronto-Vancouver section and a Montreal-Vancouver section, the Canadian Pacific was able to provide year-round double daily streamliner service across Canada without greatly increasing its train mileage, yet giving Canada its first real streamliner on top of its already famous "Dominion" train service known to millions of travellers around the world. The problem was neatly solved by operating sets of the new equipment from Toronto to Sudbury where the Montreal section joins, and making up a single through Vancouver train there. Eastbound, the "Dominion" and "Canadian" are split into two trains for the Montreal-Toronto destinations.

The Budd built cars are the final capstone in 20 years of shotwelded, stainless steel Budd technique. They have the Budd disc braking system, ideal for mountain or high speed braking to keep the shoes cool and the inside quiet. Tightlock couplers, on every car, keep the train into a single, quiet, jerk-

Norman R. Crump, president of Canadian Pacific. He was elected president in May 1955 after serving six years as a vice president. A diesel minded man, he earned a B.S. degree from Purdue University on a thesis on diesel locomotives in 1936.

David S. Thomson, vice president, started as a messenger in the Angus shops at the age of 15. He became general manager of the Eastern Region after rising steadily through the operating department. Was named system vice president in 1955

R. A. Emerson, vice president Operation and Maintenance, is a third generation railroader. He started with CPR in 1935 as a roadmaster in Manitoba. In 1950, he was named assistant chief engineer. A year later he was chief engineer of the system.

An Alco-GE closed cab freight locomotive hauling a train for the Canadian Pacific Railroad. It develops 3000 hp from both A and B units.

free unit. Asbestos brake shoes will wear up to 100,000 miles in place of 6,000 miles for the ordinary iron brake shoes used on conventional clasp-type brakes working directly on the wheels. Air conditioning is by Canadian Frigidaire; 25-35 kw axle driven electric generators and either Electric Storage Battery or Gould 600 amp.-hr. storage battery sets are fitted on each car. In general, the dome car units follow closely the type used on the Burlington-Rio Grande-Western Pacific's California Zephyr streamliner, while the room sleepers are a composite of the Zephyr and Santa Fe car designs. An innovation that will save great sums in maintenance on the Budd cars has been the use of a permanent plastic interior finish instead of paint. Extensive use of soundproofing, of both car body and running gear; Rolokron anti-wheel slip devices; carefully engineered air conditioning and heating for extremes of Canadian climate, and every hotel-room type of facility and comfort has been provided to make the 3-day transcontinental journey appealing to passengers. Departure from ice-activated air conditioning is a big forward step for the CPR.

The diesel passenger pool comprising 53 units, sufficient to maintain the daily double transcontinental service of the "Dominion" and "Canadian," is adequate for spares and extra heavy trains in rush periods. Operating across Canada like clockwork, three units, comprising a single locomotive, depart in the early afternoon and evening from Montreal, daily, and from Vancouver twice in the evening, making a complete round trip back to Montreal where all servicing is done. Because the lighter weight trains on present schedules call for only two units on parts of their runs, this pool of diesels cycle into Toronto and from Montreal to Quebec which enables them to pile up an average of about 18,586 miles per month, unusually high mileage for a complex run like this. Routine running checkup, fuel, water, lube and sand, plus an exterior scrubdown between morning arrival and evening departure is all the attention they get until returning to Montreal.

Up to now, the long, heavy passenger trains wind over the Schreiber Division and battle the Rockies, Selkirks and Coast Ranges on easy, dependable schedule with no delays due to motive power, and "On Time" performance. Diesels help keep the windows clean and the scenery unobstructed and the passengers quietly asleep with no jerks, jars or piston thrust to give that bouncing wiggle on starting or heavy pulls.

As the roster of diesels grows in the Eastern Region of Canadian Pacific, the need for a modern straight through diesel maintenance and repair shop in the Montreal area becomes imperative. With transcontinental pool passenger locomotives, heavy yard and switching movements gradually approaching 100% diesel; the Montreal-White River area 100% dieselized, and the Toronto-Detroit and Montreal Quebec lines pushing steam out, Montreal was chosen for the big new shop facility. By the time this is published, St. Luc diesel maintenance shop will be practically finished. St. Luc diesel Shop is located in the St. Luc freight terminal in the outskirts of Montreal.

Main shop building is 77 ft. wide by 257 ft. long and constructed of heavy reinforced concrete foundation and floors, structural steel superstructure with cement asbestos combination wall panels above the platform level, a steel roof deck and 20-year bonded and insulated roof. In place of the usual industrial sash, large areas of the walls are covered with corrugated fibreglass reinforced polyester panels. Interior partitions are concrete block. Rolling overhead steel doors are fitted across each track opening.

St. Luc Shop facilities include: 1. Two run-through tracks on which 4-unit locomotives can be serviced from three levels simultaneously—the trucks from the inspection pits and the depressed floor levels, and the diesel engines, generators, train heat units, etc., from elevated platforms at cab floor level. 2. One stub track, 127 feet long, on which the wheel truing machine is located. This facility permits truing wheels without removal from locomotive at fixed operating intervals. 3. Workshop area 27 x 118 ft. with full basement; a floor at elevated platform level and a mezzanine floor above. Water softening equipment, clean and dirty lube

A Fairbanks-Morse type Trainmaster, 2400 hp, on the test run at Nelson, B.C.

The western half of the Canadian Pacific system.

oil tanks and pumps, electrical switchboard room and main fresh air fan room are located in the basement. Parts cleaning and conditioning shops, parts and tool room, store rooms and locomotive foreman's office are at upper platform level. Lunch, locker, toilet and wash rooms are on the mezzanine

Along both sides of the two run-through tracks are outlets for steam, air, hot and cold water, at the depressed floor level and elevated platform level. Lube oil dispensers are provided at the upper level, and light oil outlets between the rails at the lower level. 110 volt and 550 V electrical receptacles are provided for operation of extension lights, power tools and welding machines. Access between the various levels is provided by a series of ramps and stairways. At one end of the two run-through tracks, 2 three level crossover bridges provide access between the platforms at the upper level, and the depressed areas at the lower level when in raised position. When lowered the same bridge closes the gap in the trackage to permit exit of locomotive units. These bridges are unique in that they were designed by CPR engineers and utilize a simple hydraulic ram to raise and lower the deck structure.

Against the day when the whole territory radiating out from Montreal will be 100% diesel, St. Luc Shops have been designed to be extended on one side to provide two additional 4-unit run-through tracks and on the other side to provide a drop pit and heavy repair facilities.

CHAPLEAU, ONTARIO DIESEL SHOPS

To function as an intermediate shopping facility on the long route from Montreal to Winnipeg and Toronto-Sudbury 260 mile transcontinental route, two small diesel shops are situated at Chapleau, mainly to service the freight units and local units working in the whole area.

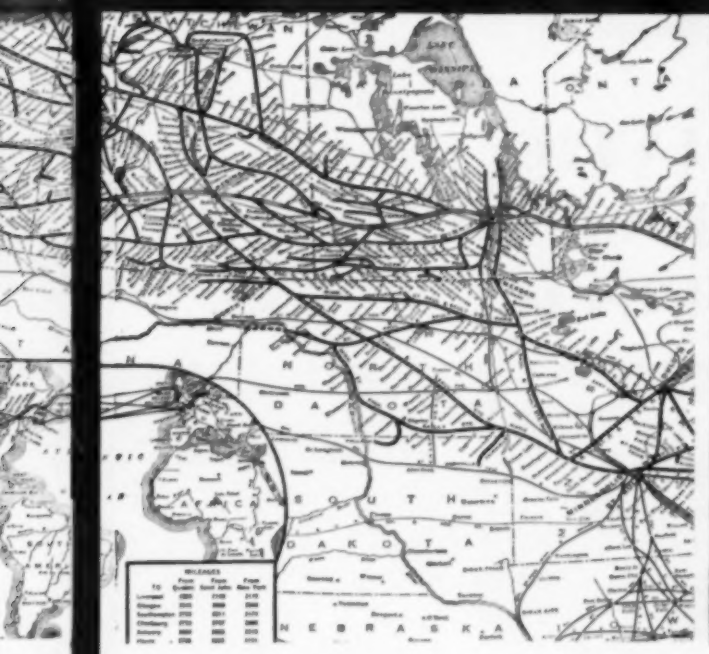
The main shop, started in 1949, handles running maintenance on the 5,000 mile cycle, or about twice monthly on each unit. This contains two through tracks with elevated platforms, a drop pit, four storage tracks accessible from the turntable for minor repairs and washdowns.

It also has a 10 ton overhead electric hoist capable of removing main generators and other heavy components through roof hatches in units; three 5,000 gallon lube oil storage tanks and a 1,000,000 diesel fuel oil storage tank; machine shop, welding shop, fuel system test racks, tool rooms and records office. The smaller of the two Chapleau started in 1953, handles annual examinations at which heavy repairs, modifications and refurbishing takes place. It also has two additional pits for checking and maintenance and is similar in general layout to the main shop although on a smaller scale.

Of all the great railroads of the world, the CPR is unique in that it has ordered only three strictly passenger diesels in its history! Out of 558 units in the inventory at the end of 1955, three Electromotive-GM E8 units of 2,250 cars in service on the Montreal-Wells River run to Boston, on the Alouette and Red Wing, operating in a pool with three similar Boston & Maine E8 units. Before and since these were ordered as a part of 100% dieselizing this important international route, where 41 steamers were replaced with 23 diesels, CPR has ordered nothing but road switcher and freight type single A & B units, and freight-passenger units modified to handle heating boilers and extra water tank capacity. It is not uncommon to see both closed and open platform type units coupled together anywhere on the system, and the same odd string going one way on passenger and the other way on freight trains! So successful has the CPR been with this flexible, unique method of hooking everything up to everything else, the Union Pacific Railroad has borrowed the CPR's ingenious methods to their own great advantage. As far as practicable, locomotives by a given manufacturer are pooled in regions, and units are run with other units of the same make. On the Schreiber Division there is a great concentration of Alco type, Montreal Locomotive Works units; at Nelson, a heavy pool of Fairbanks-Morse, CLC units; out of Calgary and on transcontinental passenger trains, they are mostly GM-EMD units. On the E & N they're all Baldwin road-switchers. Most all road units are geared for 65 mph while those assigned to passenger service are geared to 89 mph and both A & B units have heating boilers.

The canny management of the CPR has met the problem of providing semi-luxury streamliner service to key points that cannot support a full passenger service, by ingenious use of the Budd RDC cars. Currently there are 14 of these Budd cars giving excellent account of themselves and in every case actually increased revenues! From Toronto to Detroit; Calgary to Edmonton and Calgary to Lethbridge-Ft. Mc Leod; Lethbridge to Medicine

Two GM units forming a 3500 hp road freight locomotive on the Schreiber Division.



Another workhorse of the CPR. A GM 1750 hp road-switcher, equipped with heating boiler and dynamic braking for use as passenger, freight or switcher work.

Hat; Montreal-Laurentian Highlands line; Peterboro-Toronto; Saint John and Edmundston, New Brunswick and finally, in the summer of 1955, the Victoria-Courtenay run on Vancouver Island. Amazingly, traffic has doubled on the Vancouver Island run and a single car making a round trip does the work of two separate trains! If traffic increases, a second Budd Car may have to be added to this run. The heavy grades and curves of some of the runs; need for high speed or quick stops and acceleration on others all work out perfectly and the cash customers pile up more money at the ticket wickets. Not only have red runs turned to black, but most have turned into deep black! Best of all, the Budd cars have taken people out of their private autos and from the buses and put it profitably back on the rails.

Canada's economy until recent years, has been based on the traditional pattern of manufacturing in the east and raw material extraction in the West. The CPR's main line through the Provinces of Quebec and Ontario practically cover the heavy paper-making belt of Canada. The Prairies pour

100,000,000 bushels of wheat into the world's largest battery of grain elevators at the Lake Superior ports of Ft. William and Port Arthur. From Cartier, Ont. to Kenora, in far western Ontario, the CPR runs for 800 miles without a single branch, most of it across the broken edge of the great Canadian Shield. It traverses the entire Great Lakes Forest belt between these two points. From Port Arthur to Winnipeg, the grain traffic is so heavy the entire line is double tracked, and a constant procession of grain cars moves down from the Prairies to the Great Lakes ports. In winter the grain goes into storage, or some of it moves east to the open ports on the Atlantic. When the ice lets go on the Lakes, a huge procession of freighters clean the stored grain and by fall, when the new crop starts moving, the vast elevators are empty and the process begins all over again.

Ore movements toward the great smelters at Sudbury; pulp and paper chemical moves to the paper industry in the region, plus the fact that all the way from Port Arthur to Sudbury the line is single track and must carry the transcontinental traffic from the far West, all tend to make the Schreiber Division, extended, a No. 1 bottleneck on the CPR. As British Columbia industrializes and more refined forest products, chemicals and paper go by rail east; and as the once famous Alberta coal belt turns to a veritable flood of oil and refined petroleum products, the steel and machinery for these expanding industries in the West flows in one direction and the new flood of Far-Western output, including non-ferrous metals from the Kootenay refineries, flows in the other.

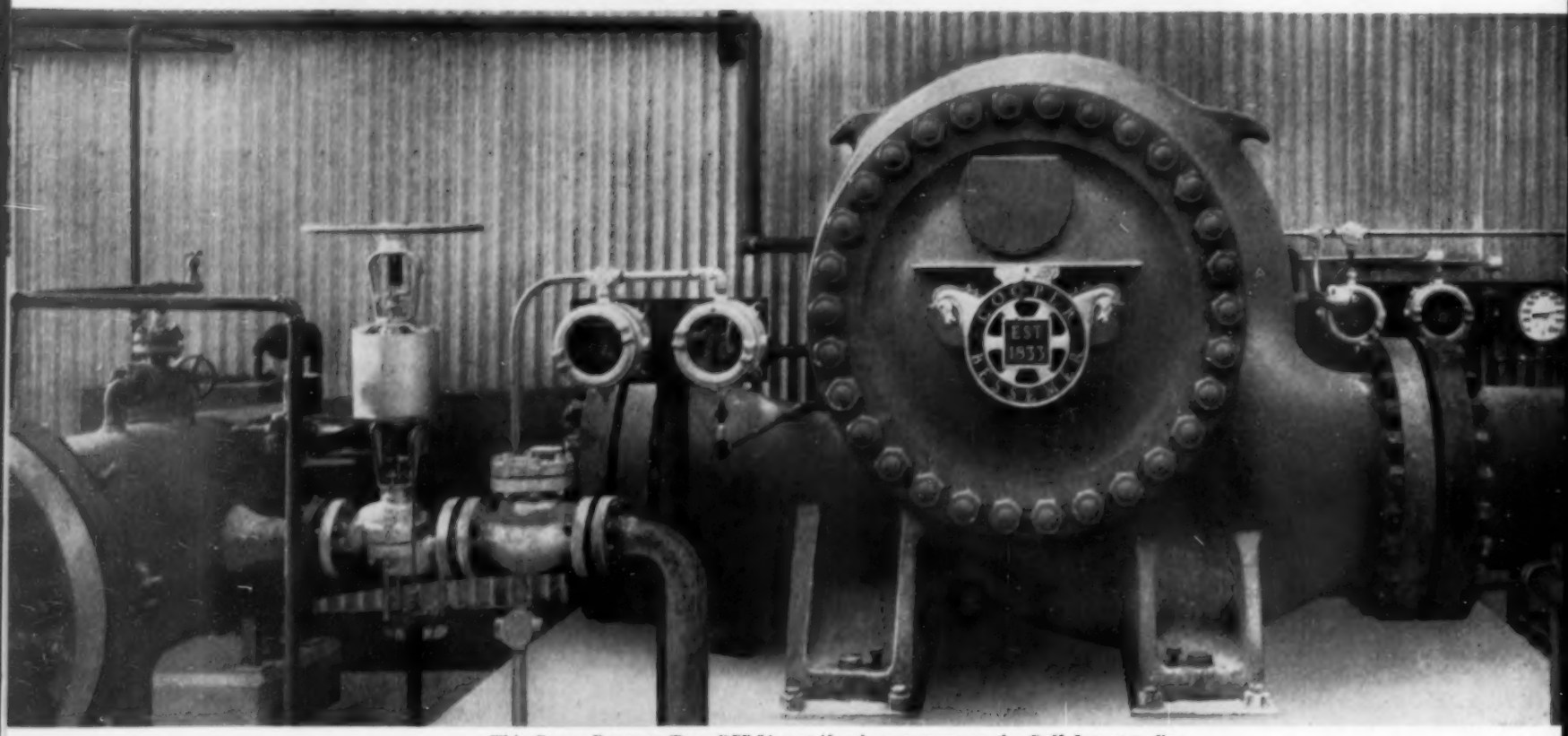
The Schreiber Division and all the rest of this 800 mile bottleneck line is perfectly set by nature, topography, climate, economics and everything else for diesel operation. It is a known fact that Canadian Pacific administrations before President Crump took over almost created a scandal in railroading by their refusal to dieselize this bottleneck line. It should have been converted the same year the Santa Fe let go—1940-1942, and the economies would have paid for dieselizing all the rest of the whole CPR in fifteen years!

Most of the area is bad, or expensive for laying decent size passing tracks. Water is an expense. Curvature, grades, lack of population, inaccessibility of fuel which has to be hauled in from far East or Midwest, and the long bitter winters, make it a wilderness railroad to move traffic over as fast as possible, and with as little red tape as possible. Even keeping shop crews can be a problem here when the rest of Canada's booming economy lures men to the "outside." To increase the size and speed of steam powered trains in this region, would have meant huge outlays for heavier and more steeply banked track from one end of the line to the other; exactly the same track and plant economics as dictated the dieselization of the Gulf, Mobile & Northern lines. The 100 lb. rail on the CPR's Schreiber Division can do twice the work with diesel as it could with steam. A typical month last summer showed some 86 diesel units assigned to the Schreiber Division. Six old steamers of the G3 and P2 class are also shown. Total mileage from Cartier to Current River (Ft. William) is 511.1. Heavy traffic from the Totonto and Montreal "legs" of the transcontinental line merge at Sudbury, part of which goes west to the Sault St. Marie connection with the CPR-owned Soo line, and the rest bottlenecks on the Schreiber Division headed West. Good balance of traffic and no junctions or branches to contend with, makes this a tough routine of keeping traffic flowing with no delays and ample reserve capacity for extra sections or more cars.

The run over the 128.5 miles to Port Arthur is non stop and made in 2 hours and 55 min. At one spot it is possible to see 50 miles across the deep blue of Lake Superior to the edge of the world. Scenery, hit by proper scheduling, is the whole basis of the Canadian's transcontinental schedule. And careful handling by these high-seniority engine crews and well-maintained diesels justifies the whole new concept of train operation and design on the CPR.

FOOTNOTE: The *Roster of Motive Power of the Canadian Pacific as of February 5, 1956* shows a grand total of 558 units of all sizes in operation; a Roster of active and laid up steam power totalling 1417 locomotives and a total of 88 Yard & Road Switcher diesel units on order for 1956. Fourteen yard switchers of 600 hp. each—99,000 lb. weight, from Montreal Locomotive Works; 44 Road Switchers of 1600 hp.—260,000 lb. weight, from M.L.W. and 30 2400 hp. Road Switchers (six wheel) — 388,000 lb. weight from Canadian Locomotive Company. This is one of the largest orders for Fairbanks Morse type units placed to date.

FIRST FULLY-AUTOMATIC ENGINE-DRIVEN CENTRIFUGAL COMPRESSOR GOES ON MAINLINE SERVICE



This Cooper-Bessemer Type RFB-24 centrifugal compressor on the Gulf Interstate line handles over 400 million cubic feet of natural gas a day at pressures up to 935 psi. Note the Mercoid controls, two on each side of the compressor.

THE gas pipeline industry's first centrifugal compressor driven by a fully automatic four-cycle gas engine is operating on mainline service for the Gulf Interstate Gas Company. The unit is installed in a satellite compressor station near Stanton, Kentucky with facilities for operating unattended by remote control from another compressor station 80 miles away in Clementsville, Kentucky. Designed as a completely unitized installation, the unit operates entirely on its own auxiliary accessory equipment. The development of the automatically controlled engine-driven centrifugal compressor unit is a joint accomplishment of the Gulf Interstate Gas Company and The Cooper-Bessemer Corporation.

Although 4-cycle gas engines and centrifugal compressors have been used separately for pipeline transmission work for several years, this is the first time that both engine and compressor have been combined into a single unit for mainline service. Economies in installation, fuel and maintenance costs resulting from the combination offer many significant advantages to pipeline operators.

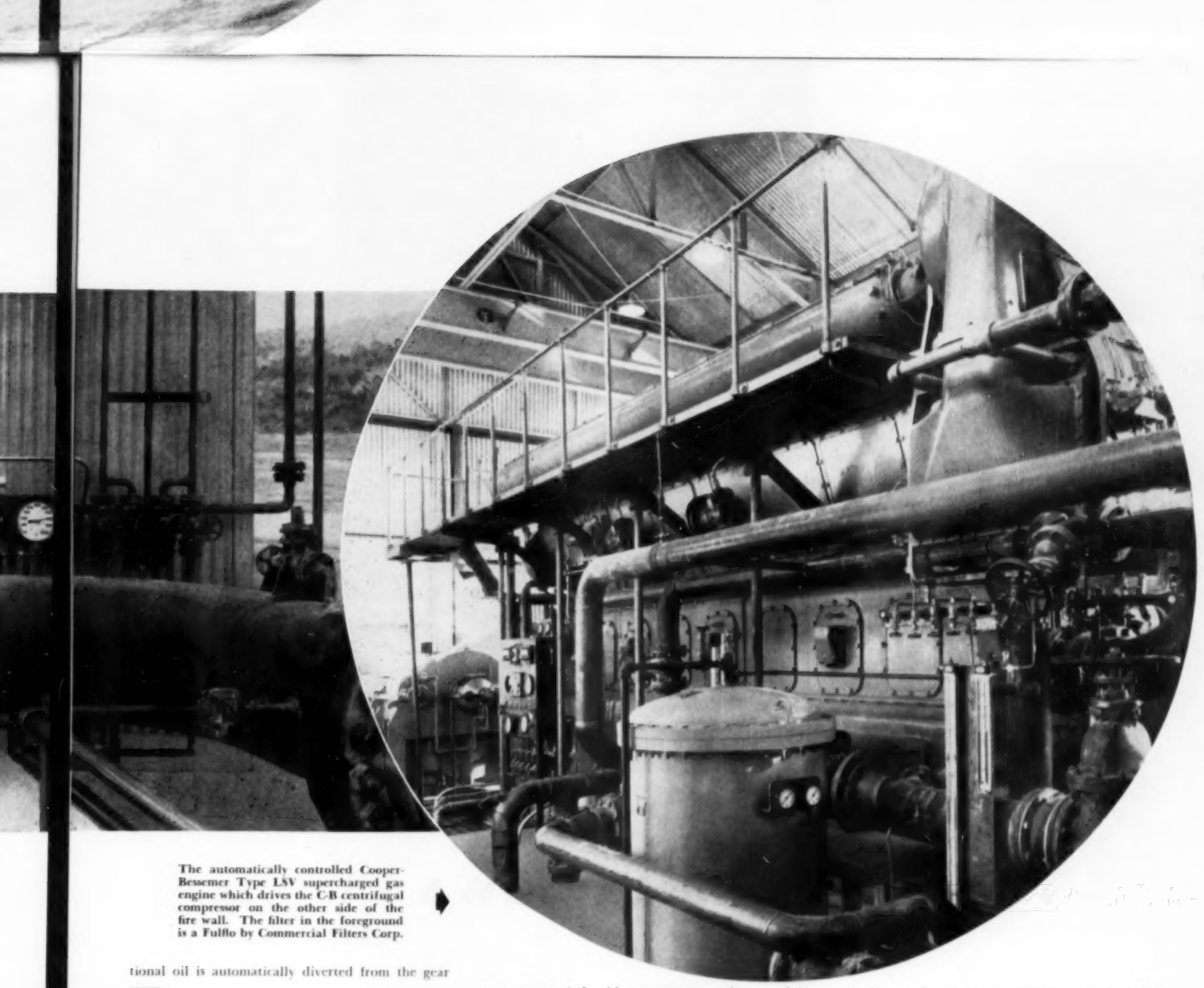
The centrifugal compressor at Stanton, Kentucky, is capable of handling over 500 million cubic feet of gas a day at discharge pressures up to 950 pounds per square inch. Driving the centrifugal compressor through a speed increaser is a Cooper-Bessemer Type LSV, 16 cylinder, 4-cycle gas engine that delivers up to 4550 horsepower. The engine is spark-ignited, supercharged and equipped with turbocooling, enabling it to operate at fuel economies of slightly over 6000 Btu per brake horsepower hour.

An operating feature of unusual interest is the utilization of turbocooling of manifold intake air developed by The Cooper-Bessemer Corporation. By means of expansion cooling of intake air through a unique turbo-blower system, it has become possible to substantially increase the air-fuel charge to the engine. Resulting increases in horsepower are accomplished without corresponding increases in heat load on the engine itself. With expansion turbocooling, manifold air intake temperatures are reduced without the high consumption of water as on conventional systems, a particular advantage where water is restricted.

Unusual compactness in design has been achieved by the engine-driven centrifugal compressor combination requiring simpler, less expensive foundations than normally needed. For example, to duplicate the gas pumping capacity would require 2 to 5 conventional compressor units. With its ability to handle large volumes of gas, the unit at Gulf Interstate's Stanton Station acts as a booster to help meet peak demands during winter periods by partially unpacking the line and in effect duplicates the peak shaving benefits of underground storage. During normal periods, the heavy duty engine-driven centrifugal unit operates as a conventional compressor.

The actuation of Gulf Interstate's satellite station can be controlled by direct wire. Equipment is provided for opening and closing line valves, starting the engine, cutting the engine-compressor into the line, controlling engine speed, for setting station discharge pressures, cutting the compressor off the line and shutting down the engine. Essential operations are telemetered to the main station. Sight and sound alarms signal any malfunctioning at the main control panel at Clementsville and, where necessary, automatically shut down the unit.

To start Stanton Station's automatic engine-driven centrifugal compressor unit, controls initiated at the Clementsville panel first open the line suction valve. The blow down valve is normally open when the station is off of the line. After a period, the blow down valve is closed and the line pressure builds up in the compressor case. The discharge valve closes, actuating a permissive start switch to energize the engine starting circuit. Simultaneously, engine auxiliaries such as the oil circulating pump are all initiated to circulate oil from the gear sump of the speed increaser through a gear oil heater. The oil level is automatically maintained in the seal oil tank for the centrifugal compressor shaft seals. In event of low oil level, addi-



The automatically controlled Cooper-Bessemer Type LSV supercharged gas engine which drives the C-B centrifugal compressor on the other side of the fire wall. The filter in the foreground is a Fulflo by Commercial Filters Corp.

tional oil is automatically diverted from the gear sump.

Only when all auxiliaries are properly functioning and line valves correctly set can the main start switch actuate the engine starting circuit. Pushing the start switch button at Clementsville Station initiates the engine starting sequence by energizing the automatic control circuit of a 3-way air-solenoid valve to admit starting air to the engine. After the engine picks up speed and runs for a set purge period, the ignition is turned on. The fuel gas safety shutoff valve and starting fuel valve are then opened admitting fuel to the engine. Only after engine gires and reaches partial speed does the engine speed control switch energize the control circuit of the main fuel gas valve. At the same time, starting air is shut off, and the main fuel valve opens.

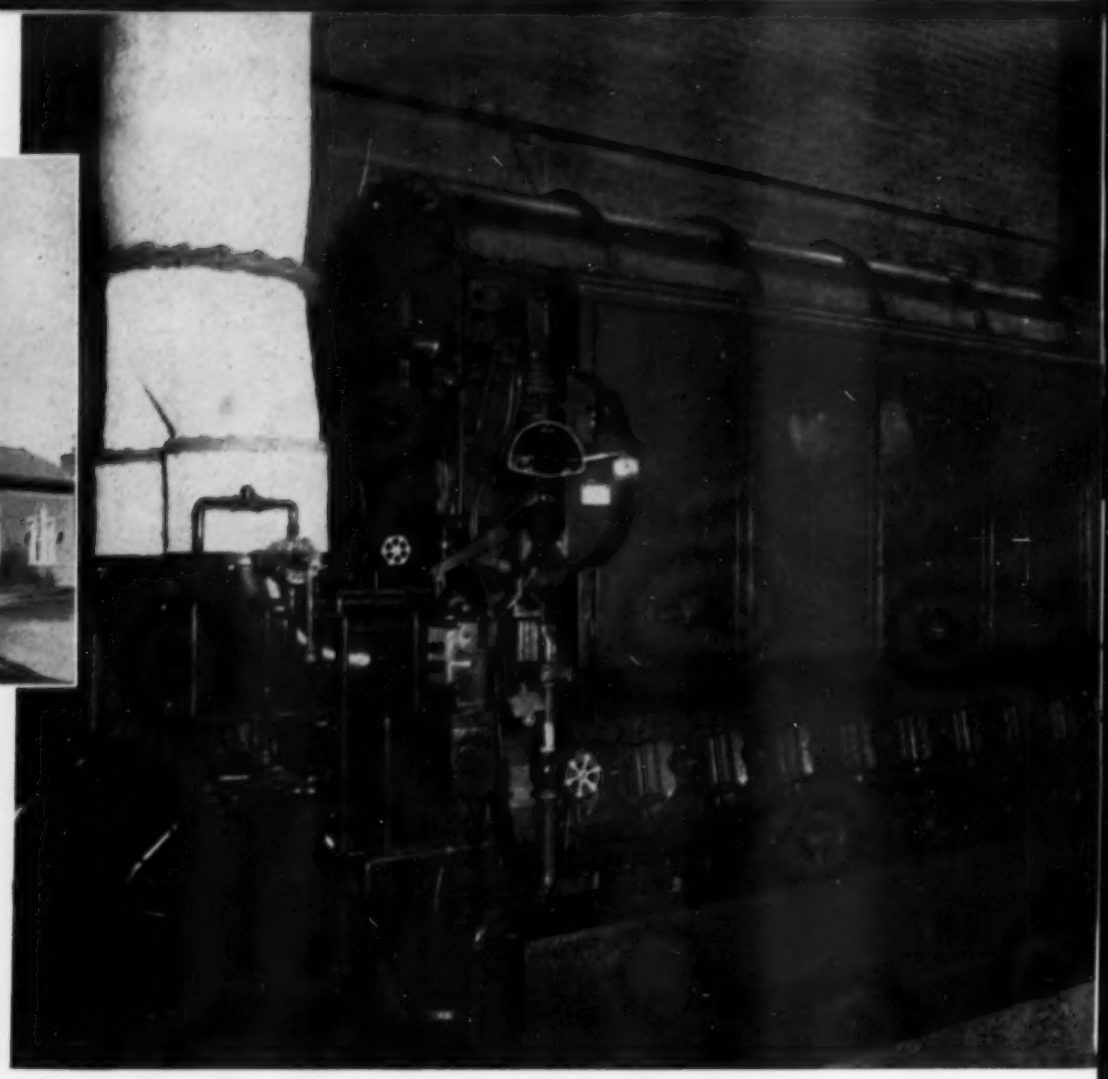
At partial engine speed, gas pressure is admitted to the diaphragm of a 3-way valve in the control air line to a shut down cylinder on the gas regulating valve and to a pneumatic link in the governor control mechanism. With the gas regulating valve in operation and control air pressure on the pneumatic engine governor, the engine idles through a warm-up period. After warm-up, engine speed is regulated to a pre-set value by an automatic timer. Once the engine is running at speed, line valves are opened in proper sequence to load the engine. The line discharge valve opens first. The line suction valve is then opened. Discharge pressures set on the control board at Clementsville are maintained automatically through the engine speed governor. Discharge pressures are varied by regulating engine speed.

Pushing the "stop" button at Clementsville sets up the shut down sequence. The main fuel gas solenoid is de-energized closing the main fuel valve. The safety fuel gas valve then is closed. As engine speed drops down, line suction valves and discharge valves are closed. The ignition is grounded shutting off the engine. When suction and discharge valves are fully closed, the blow down valve is opened blowing down the compressor. Shut down safety devices sound the alarm and turn on a lookout light at both Clementsville and Stanton Stations. The devices shut down the engine, close the side gate valves and blow down the yard piping.

When shut down is initiated by a break in the pipeline or fire in the supervisory or main building, the engine can be restarted only at Stanton. Malfunctions that shut down the engine but permit restarting at Clementsville are: overspeed of engine, low oil pressure, high discharge pressure and high temperatures. Safety devices are provided to sound alarms at both Clementsville and Stanton but not shut down the engine in the event of loss of fuel gas heater pilot (which shuts down only the fuel gas heater); low oil level; loss of water pump seals; low water level; low air pressure and low seal oil level. Trouble lights indicate loss of AC power, loss of REA power, gas surge in centrifugal compressor, variation in discharge pressure of 5 pounds off set valves, loss of telephone lines.

Functions telemetered to Clementsville are variation in suction pressure, discharge pressure or starting air pressure; variation in engine rpm and setting in discharge pressure controller. In addition to start up and shut down from the remote station in Clementsville, Stanton Station can be operated manually if desired. A complete switch panel is available to perform manual starting, with or without electric power from the REA system which is the lone source of supply to the station.

The Indianola power plant with stack at left indicating its origin as a steam plant back in 1890. Today it is a modern station with Fairbanks-Morse dual-fuel engines producing power at a fuel cost of 4.5 mills.



Newest engine in the plant is this 12-cylinder Fairbanks-Morse opposed-piston dual-fuel engine installed in December 1953. Rated 1680 hp at 600 rpm, the unit was put on the foundation of an old 560 hp diesel. This view shows the Nugent Silcron fuel filter, Woodward governor, F-M alternator, and Air-Maze in-line intake silencer.

INDIANOLA, IOWA

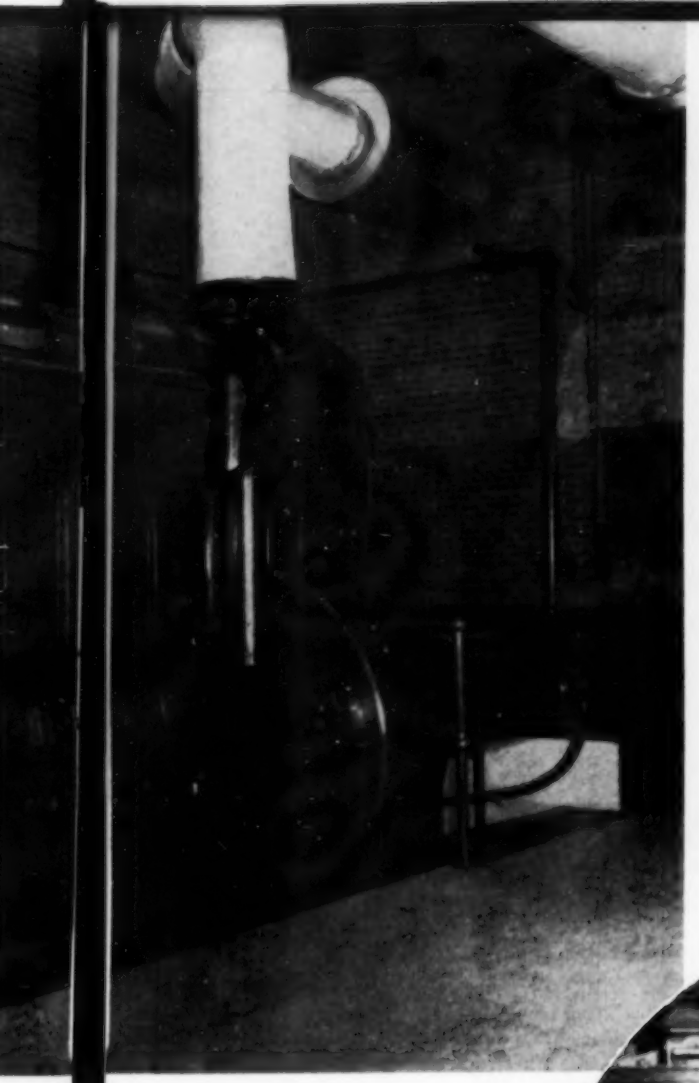
Two Fairbanks-Morse Dual-Fuel Engines of Different Types Team Up To Reduce Plant Production Cost to 6.8 Mills

WITHIN a 5-year period, a quiet but complete revolution has been effected in the municipal power plant at Indianola, Iowa. Two new Fairbanks-Morse dual-fuel engines have taken over more than 94 percent of the load and the result has been a 47 percent slash in fuel costs and a 45 percent cut in plant production costs.

Indianola is not the site of spectacular industrial development. Outside of a single grain elevator, there is nothing classified as industry in all the town. No one has struck oil or discovered uranium. It is just a nice place to live 17 miles south of Des Moines. Much of the Des Moines industry is in the southern section of Iowa's capitol city and it is convenient to work in bustling Des Moines and live in quiet, comfortable Indianola.

New homes by the dozen are rising in this town of 5,000 residents, a factor insuring growth of demand for electricity. Besides, Indianola householders are investing heavily in modern electric appliances, particularly the power-consuming comforts of air conditioning. All this has brought a steady increase of 10 per cent a year in demand for electric power.

The municipality always has supplied its citizen's power and light requirements. The first city-owned plant (with steam equipment) was constructed in 1890 and served adequately for 35 years. When load outgrew the plant and its obsolete equipment, the city had to decide whether to enlarge and modernize with diesels or to abandon the plant in favor of purchased power. The decision was in favor of continuing municipal power generation and the city installed two 360 hp Model 32 Fairbanks-Morse diesels. The following year, a 560 hp Model 33 F-M diesel was put into service. It was a full 10 years later that additional capacity was required and the city put in an 875 hp Model 33. When engines again became available after World War II, the city replaced one of the original 360 hp units with a 1200 hp Model 33E16 F-M diesel.



lion's share of the 6,859,100 kw. hr. total and pared average fuel cost to 5.1 mills per kw. hr. and plant production to 8.8 mills.

While their one gas-burning engine was rolling up this record, Indianola engineers took the next big step, installing in December 1953 a 12-cyl., dual-fuel Fairbanks-Morse opposed-piston engine rated at 1680 hp at a conservative 600 rpm. The compact OP replaced the old 560 hp engine and fits comfortably on the same foundation although it produces three times the power. The year 1954 showed the full effect of Indianola's modernization and expansion program. Total generation was 7,936,030 kw hrs., of which the 2100-hp unit produced 4,356,600 kw hrs. and the 1680-hp OP 3,116,430 kw hrs. The plant's average fuel cost hit a low of 4.5 mills and the plant production cost average was down to 6.8 mills.

Even this does not represent the full economy potential of the two engines. Gas is purchased on an interruptible basis and the plant receives its full gas requirements just 80 per cent of the time. The rest of the time, the supply is partial or completely cut off. When gas is low, the plant uses as much as is available, filling in with as high as 45 per cent fuel oil. Normally, the engines require only 5 per cent pilot oil for dual-fuel operation.

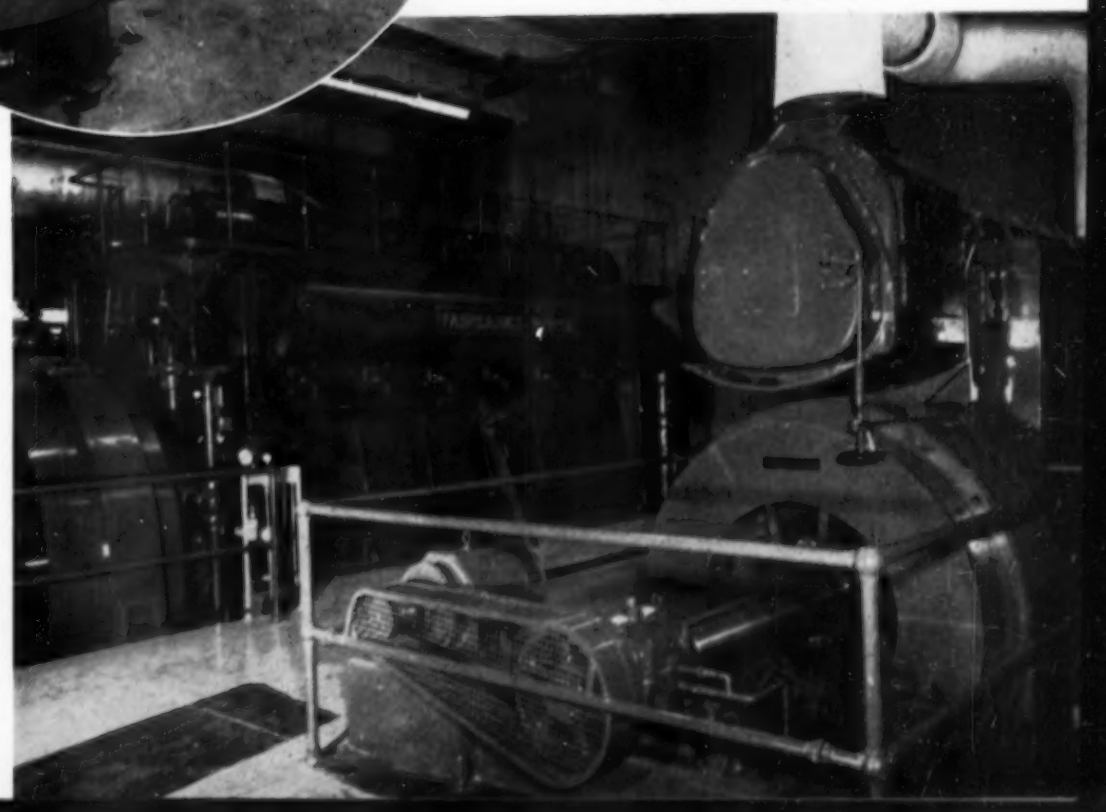
The 1000 Btu. gas is purchased at a rate that dips quickly from 50.2 cents per mcf for the first 100 to 29.7 cents for all over 500 mcf. Reaching the plant at 50 lbs., the gas is reduced to 32 lbs. by individual regulators at the engines. For pilot oil, the plant uses a 34-36 gravity fuel for which it pays 10.8 cents. For full oil operation, a 24 gravity fuel is used at a price of 9.75 cents a gallon. The pilot oil is trucked in from Des Moines and stored in a 20,000-gal. tank. Three additional tanks of this capacity hold the diesel fuel which is brought in by rail from Missouri. The dual-fuel engines are provided with day tanks ample for straight oil service, a 600-gal. tank for the OP and a 1250-gal. tank for the 2100-hp unit. Both engines are equipped to heat fuel with jacket water but this is not necessary with the oil now in use.

Lubrication practice is just a step off the beaten path in that a straight mineral oil rather than a detergent lube is used in the opposed-piston diesel. There is a full-flow strainer in the pressure circulating system and in addition some oil is bypassed through a multi-element filter with activated clay cartridges. The engine runs so clean that it has been necessary to repack the filter cartridges only about twice a year.

The 2100 hp engine is lubricated with a detergent-type oil and filters are arranged in the same manner except that cellulose cartridges are used rather than activated clay. A check after 6,000 hours of operation showed rings and bearings in new condition. Lube consumption for both engines has been good. The average for the entire 4-engine plant in 1954 was 3895 rated hp hrs. per gal. of lube.

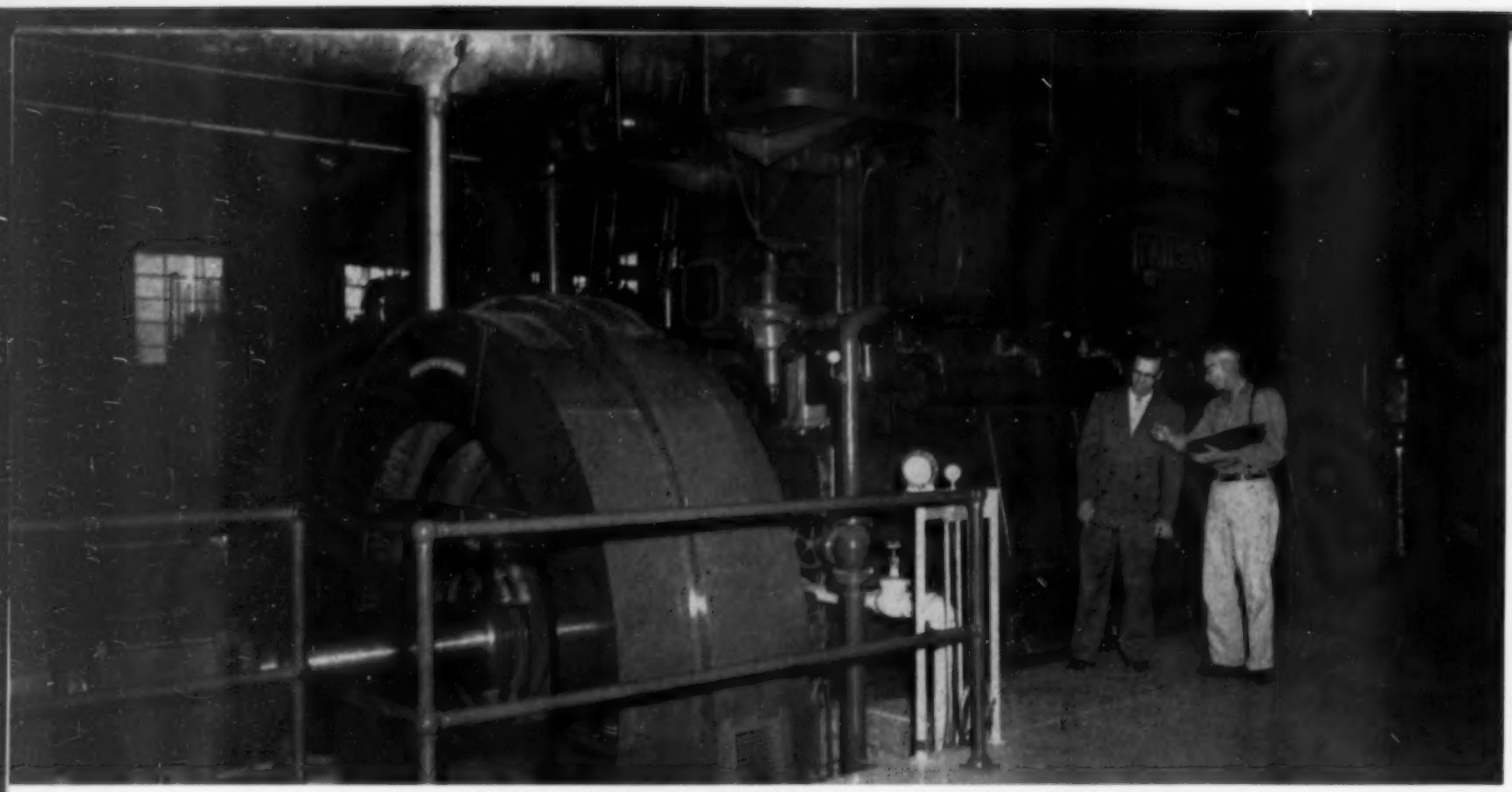
Heart of the cooling system is a forced draft tower

Lubricating oil is cleaned continuously in these two Hilco filters, the one on the left with cellulose cartridges serving the 2100-hp engine, the one at the rear with activated clay cartridges serving the opposed-piston engine.



These two Fairbanks-Morse dual-fuel engines teamed up in 1954 to produce more than 7,450,000 kw hrs., more than 94 percent of the plant total.

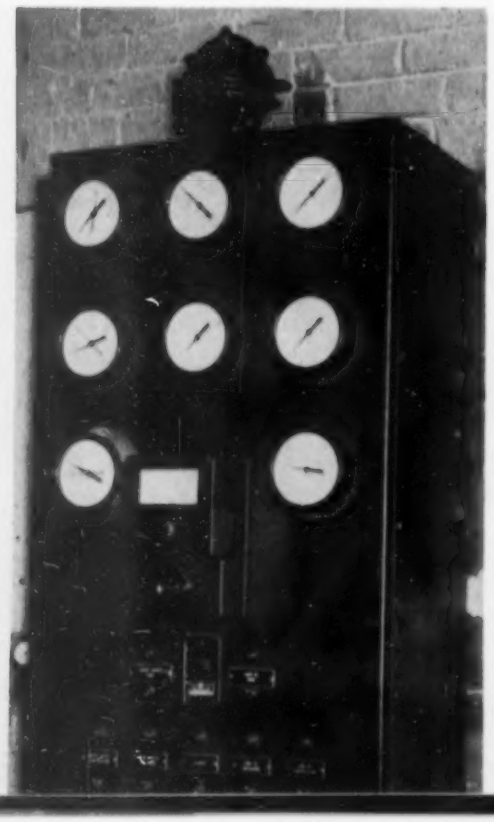
This was the status of the plant through the fiscal year 1949-50. The four oil-burning engines, two of them more than 20 years old, produced 5,693,500 kw hrs. at a fuel cost of 8.5 mills per kw hr. Plant production cost totaled 12.4 mills. Then, in the Spring of 1950, Indianola officials started the revolution with installation of a 6 cylinder Model 31AD18 Fairbanks-Morse diesel with 18-in. bore and 27-in. stroke, rated at 2100 hp at 277 rpm. No natural gas was available at the time and the unit was to operate on oil but foresighted planners chose an engine that could be switched over to dual-fuel service. In the following year, the big diesel produced 52 percent of the plant's total generation and shaved plant average fuel cost to 7.9 mills. The engine really began to pay dividends after natural gas was brought in late in 1952. In 1953, the dual-fuel unit contributed the



City Engineer Harold R. George (left) checks with Plant Foreman George Boothe on performance of the 2100-hp Model 31AD18 Fairbanks-Morse dual-fuel engine, largest prime mover in the plant. The alternator is Fairbanks-Morse, the governor Woodward.

and three motor-driven centrifugals to pump water from a 15,000-gal. pond through the tower sprays and to supply the lube coolers. All but the OP diesel are tied into a closed jacket water circuit with three motor-driven centrifugals to put engine water through tubes in the tower. This jacket water, in turn, is circulated through a shell-and-tube heat exchanger to cool jacket water for the OP which has its own closed circuit and circulating pump. Temperature in the main engine-water system activates a thermostatic control which starts and stops the tower fans and controls the spray water. A separate thermostatic valve regulates OP jacket temperature by bypassing water around the exchanger. Treated city water is used for makeup. In addition to the chemical treatment, the makeup water is passed through a colloid water conditioner which is reported to have eliminated scale in the system.

Each of the dual-fuel engines has its own gauge board with Marshalltown pressure and temperature gauges, alarms on water and lube, Alnor exhaust pyrometer, and auxiliary motor controls. The panel shown was built by Peterson Electric for the OP engine.



The engines' cooling system returns another valuable dividend to the city. Jacket water is used to heat the offices, the Council Room, Fire Station and plant shop. Prior to 1950 these rooms were heated with an oil burning hot water furnace. Metering showed that from 8 to 10 thousand gallons of fuel oil a year were burned in this furnace, which was also used in summer months to heat water for showers. A large unit heater in the Fire Station and one in the shop keeps these rooms warmer than under the old system. An electric heater now provides hot water for the showers. Filtered air is supplied to the two-cycle diesels by blowers. In the case of the OP, air comes through impingement-type filters outside the building through an in-line silencer to the built-in blower driven off the engine's upper crank-shaft. The 2100 hp engine is served by a motor-driven blower. Air comes through a Burgess-Manning intake snubber to a chamber inside the plant, then through American Air filters to the blower. The blower motor is connected directly to the generator of the big engine it serves.

The Indianola plant is right down in town with both stores and residences nearby. The City Clerk's office is right across the hall. In this situation, the engineers have taken the measures necessary to make the diesels good neighbors. We have mentioned that intake air is silenced and similar precautions have quieted exhaust to a whisper. In the case of the OP, there is a horizontal pre-snubber inside the engine room and then a vertical snubber outside the plant.

Indianola's municipal utilities are operated under the close supervision of City Engineer Harold R. George with George M. Boothe as power plant foreman. In the improvement program he has implemented, Mr. George has had the full cooperation of Mayor D. W. Dayton, the City Council's Light Committee with B. B. Long as chairman, Theo. M. Judkins, John Piffer and V. C. Watson, as well as the other councilmen Gerald Perry and George Scott.

List of Equipment

Engines—Fairbanks-Morse. One 2100-hp., 6-cyl., 18 x 27-in., 277 rpm, Model 31AD18 dual-fuel engine.
One 1680-hp., 12-cyl., 8 1/8 x 10-in., 600 rpm, Model 38DD8 1/8, opposed-piston dual-fuel engine.
Alternators—Fairbanks-Morse.
Governors—Woodward.
Fuel oil—Standard Oil (Ind.)
Fuel meters—Emco.
Fuel filters—Nugent.
Level meters—Liquidometer.
Gas meter—Emco.
Lubricating oil—Sinclair Rubilene on OP
Socony-Mobile Tenopa 4D on 2100 hp. unit.
Lube strainers—Air-Maze.
Lube filters—Hilco.
Oil coolers—Ross.
Thermostatic control—Amot.
Auxiliary lube pumps—Roper and Blackmer.
Cylinder lubricators—Madison-Kipp.
Cooling tower—Diesel Service.
Intake in-line silencer—Air-Maze.
Blower—Roots-Connersville.
Exhaust pyrometers—Alnor.
Starting air compressor—Quincy.
Indicator—Kiene.

Dick McNeely (left) electronic specialist for the Fish and Wildlife Commission and Spencer Ware, sales manager Eastern Division, The Buda Co.

THE DIESELIZED FLOATING LABORATORY "GEORGE M. BOWERS"

By ED DENNIS

THE latest and most modern dieselized addition to the U. S. Fish & Wildlife Service's fleet of vessels, is the 73 foot *George M. Bowers*, a $150,000 floating fish laboratory. The staunch and beamy vessel can easily be taken for a large Florida type shrimp trawler but closer examination shows it to be a combination of a Pacific Northwest seiner and the popular Florida type shrimp trawler.

Not only the design and construction, but most of the elaborate equipment was installed under the direction of Reidar F. Sands, chief of the Wildlife Services' gear, research and development program, with an eye for safety and durability. Reidar F. Sand, a University of Washington trained scientist, who spent a good portion of his youth aboard fishing vessels and in the commercial seafood business, used both the practical and the academic viewpoint on the *George M. Bowers*.

The king sized winch carries 500 fathoms of cable and is designed for bringing up shrimp from 250 fathoms. Power for this winch is supplied by a model 6-DAMR-273 Buda diesel engine driving through a twin disc torque converter. This Buda diesel, rated 55 hp, will be used for slow speed trawling when the Sonar gear for fish finding is used. Under water television cameras that can be lowered for closeup pictures are also included in the equipment.

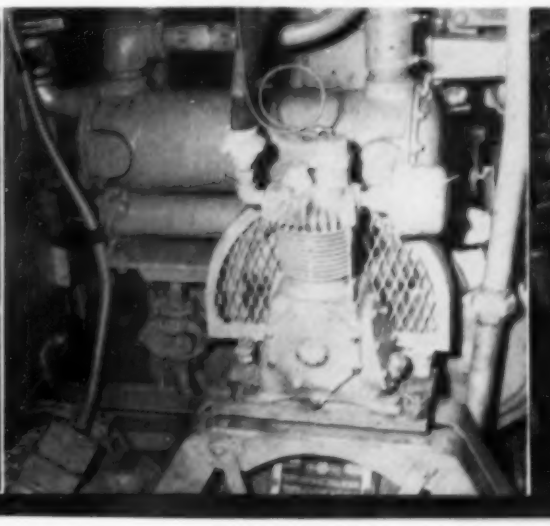
Built by the Steamway Corp. of Tampa, Florida, this husky vessel has a length of 73 feet, a beam of 21 feet and draws 7 feet of water and is designed for a cruising range of about 5,000 miles. Main propulsion is a model 6DC1879 Buda diesel engine rated 192 hp at 1200 rpm with a Twin Disc 3:1 reduction gears, capable of pushing the 92 ton vessel a steady 10 mph. A Twin Disc power take-off is used to drive the Westinghouse air compressor which supplies air for the Westinghouse Air Brake controls. A Ross heat exchanger and a Leece-Neville 32 volt generator is also included on the main engine.

In case of main engine failure, power can be supplied by the trawling engine, a 55 hp Buda diesel. All three Buda diesels were supplied by the Gulf Coast Engine Sales of Tampa, Fla. A model 4BDMRG Buda diesel generating unit with a 10 kw Allis-Chalmers generator, a 3 kw Onan diesel generating set is also included in the engine room equipment.

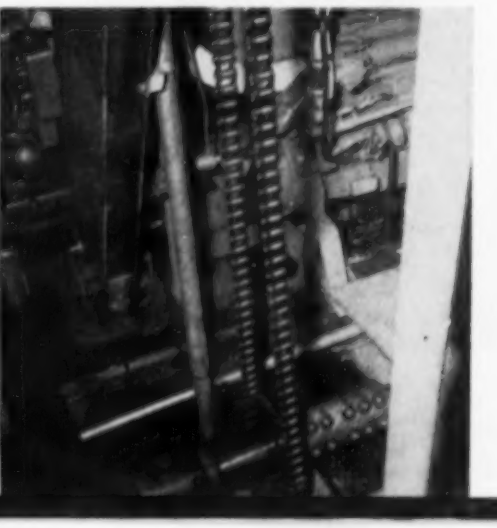
Almost all of the electrical and television setup was designed by Dick Mc Neely, electronic specialist for the Fish & Wildlife Commission. The fish exploratory vessel is named for the late George M. Bowers, a U. S. Fisheries Commissioner from 1898 to 1913. Federal scientists and University of Miami Marine Laboratory scientists, will ship with this fish finding vessel out of its home port at Miami Florida.

The main engine, a Buda diesel model 6DC1879 rated 192 hp at 1200 rpm, with a Twin Disc marine reverse gear 3:1, also Deluxe lube oil filters. Supplied by Gulf Coast Engine Sales of Tampa.

The Twin Disc power takeoff which supplied power for the Westinghouse air compressor. The Ross heat exchanger is also shown.



The Link-Belt chain drive which is used between the 55 hp Buda diesel trawling engine and the drive shaft.



IRRIGATION WELL PUMPING IN ARIZONA

By DOUGLAS SHEARING

IS the engine business staging a comeback in Arizona? On one ranch, government limitations on the amount of cotton made it desirable to raise grain. The "lift costs", however, of their electrically operated irrigation water pump made grain raising an unprofitable business. In the hot summer months when irrigation is heaviest and most essential, electric power was costing them 1½¢ per kw/h. for their operations.

On a neighboring ranch, Louis Anway and his sons—Ed, Roy and Dick—were profitably combining grain and cotton crops. They were irrigating about 2000 acres, pumping with five Superior engines fueled by natural gas. The Hales on the neighboring farm, kept a careful check for two years on their electric bills for their one 300 hp electric motor. This permitted comparison of the costs of natural gas for the five engines with electric power for the motor. It was figured that the Hales, owners of the electric motor, could have paid for a Superior engine with the difference they would have saved in the two years.

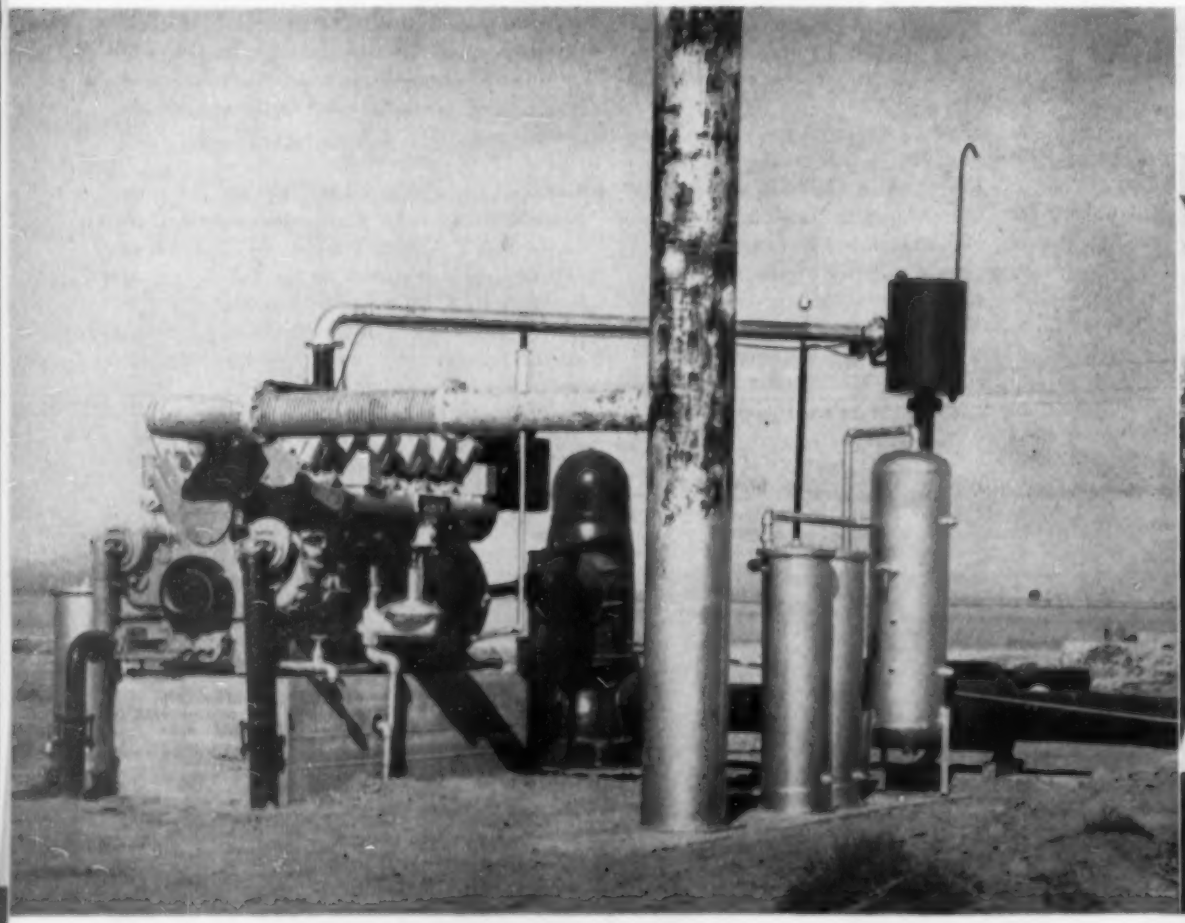
At one time diesel business was fairly brisk among Arizona ranchers. As electric utility power lines fanned out over the state and the cost and taxes on diesel fuel increased, the trend was toward electric motor driven pumps. The trend slowed down in 1948 with the opening of the "Big Inch" natural gas pipeline.

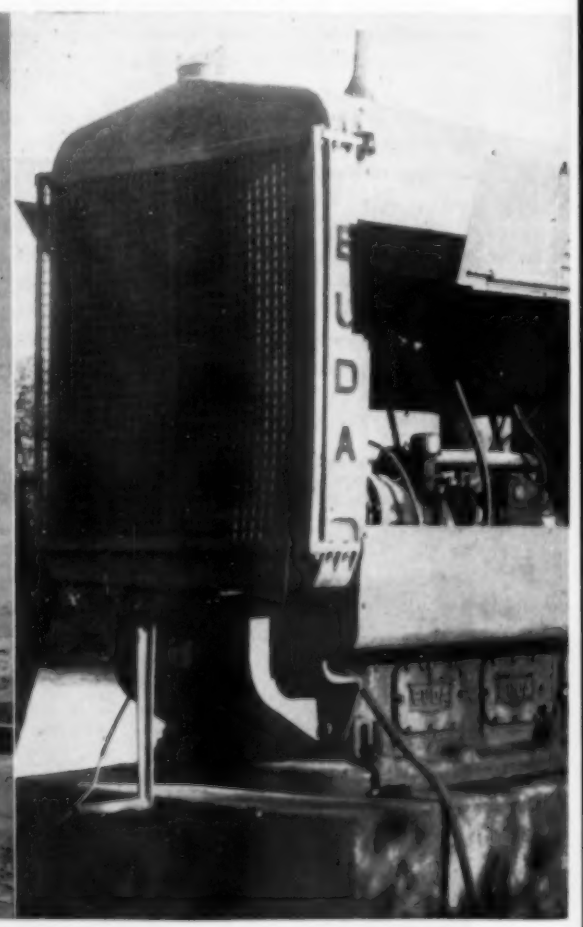
The Arizona Engine & Pump Co. was formed about this time. Its founders, Robert Ziedler and E. L. Penwell, saw the opportunity to exploit the availability of abundant natural gas. They acquired the dealership for Superior engines. The partners now estimate that more than 600 Superior gas-burning engines are pumping irrigation wells in the state. Many of the engines were originally sold or converted to gas operation by Arizona Engine & Pump Co.

Not only lower cost of operation but flexibility is the key to the growing success of natural gas engines in irrigation pumping. Electric motors pump at one speed. If the water table falls, and it has

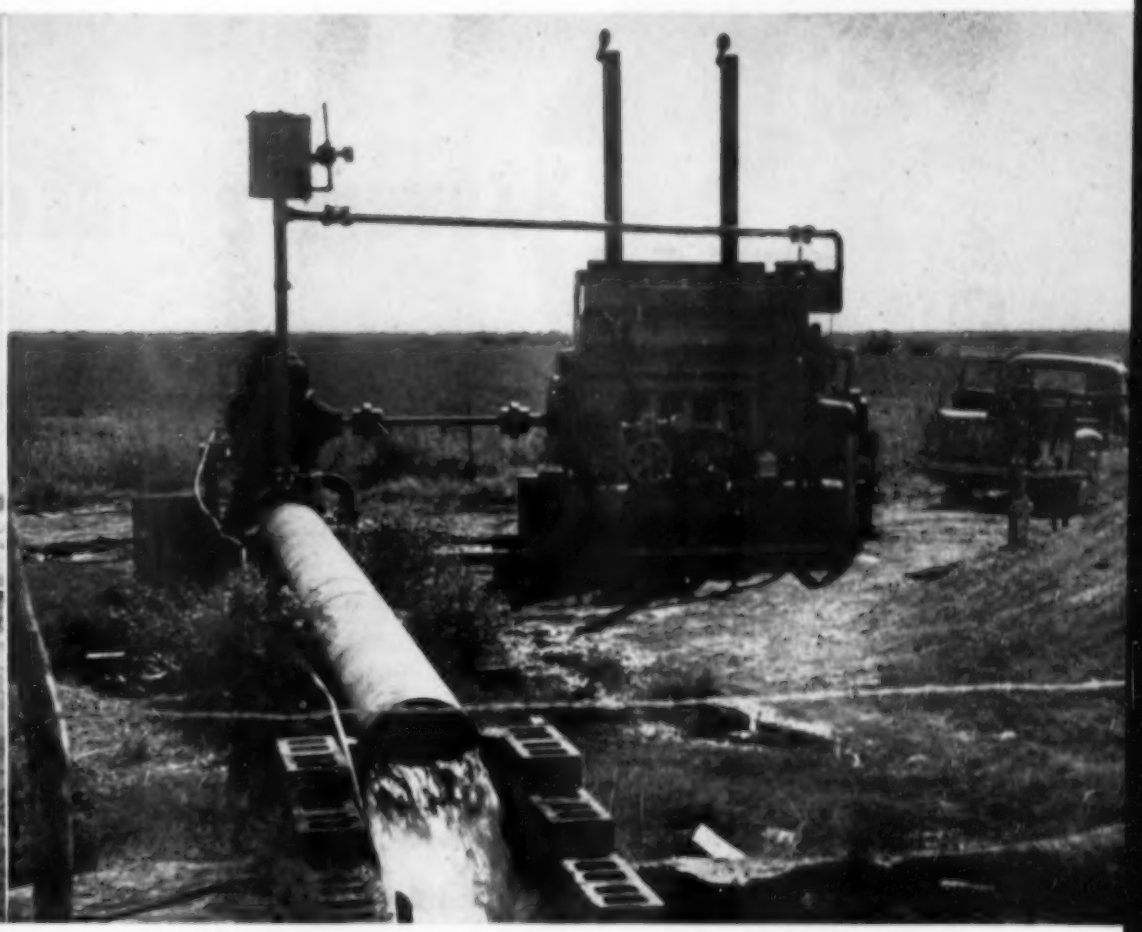
Owned by Walter R. Strong near Phoenix, this Buda diesel, 80 hp at 900 rpm powers a Pomona pump lifting water from 109 feet. The engine is equipped with a Perry water filter and Twin Disc clutch. It waters 100 acres of citrus.

A 12-cyl. Waukesha, rated 810 hp, natural gas engine pumping water for the Anerson Bros. from 300 feet. It drives a Land & Bowler pump through a Watson-Spicer drive shaft. Pump has a capacity of 4000 gpm. It mounts Winslow gas and lube oil filters.

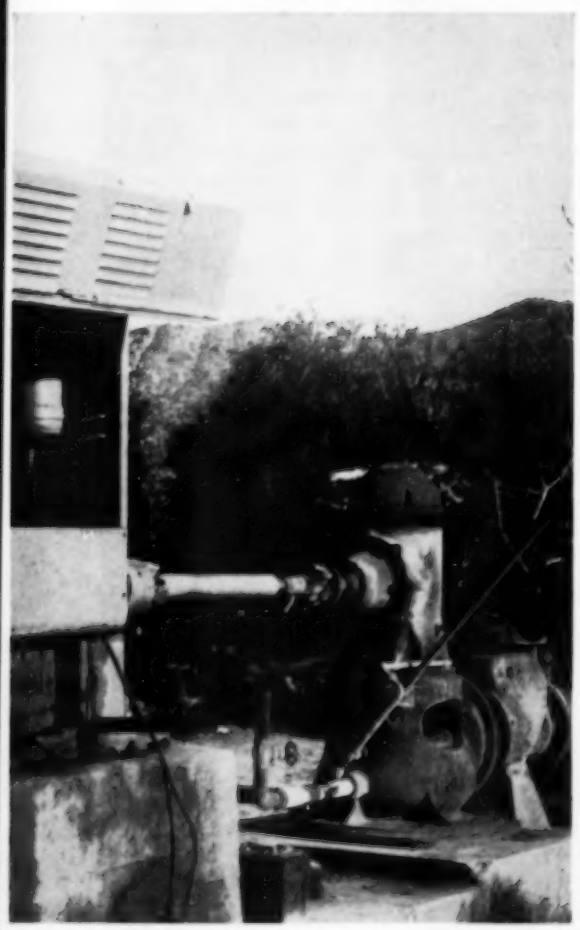




A Superior Model 6G510, 6-cyl. natural gas engine rated 300 hp on the James Smith ranch near Chandler. The speed of this engine can be stepped up to 1000 rpm, raising the hp to 325. Flexibility in speed of engine is a major advantage over a motor.



A Superior Model 6G825 on the Mary E farms in Harquahala Valley near the California line. It is rated 475 hp and delivers 3800 gpm through a 16-in. discharge. It is equipped with a Ross lube oil cooler. 4 Winslow lube oil filters, a Peco water softener and a Quincy air compressor. It has no reverse and no clutch on the stub shaft. The engine is shut down by idling then shorted out. Four of the six Superiors on this ranch were converted to natural gas from diesel.



been known to drop as much as fifty feet in one season, it gets beyond the range of the motor and a more powerful replacement is needed. With an engine, however, speed and power can be adjusted to fit the needs of the situation.

A typical example of the gas burning engine's flexibility is evidenced by the Waukesha Model VLROB-12 engine on the Anderson Brothers farm at Casa Grande. Twenty years ago 100 feet was considered about the limit water could be lifted.

As the water table dropped, wells were drilled deeper and engines became more powerful. The Anderson well is 300 feet deep with the bowls set at 400 ft. Waukesha representatives feel that this particular engine can go to 600 ft.

Irrigation well pumping engines operate unattended, continuously and for long periods of time. They are usually running in extremely high ambient temperatures and often exposed to the elements. Shelter is not always provided. The average rancher is not inclined to give an engine even the little maintenance it requires. He more likely is inclined to think of an engine as another type of motor to be merely turned on or off.

Engines in the Arizona cotton fields are normally operated from 3500 to 4000 hours per year. On engine is used up to 5000 hours in a year. Where farms where both cotton and grain are raised, the vegetables are grown the operating hours go up to a staggering 8000.

Robert Ziedler and E. L. Penwell are meeting with success in counteracting the trend toward electric motors for another reason other than the availability of cheap fuel. They and their staff are specialists. They understand well installations, the problems and are interested in making them their sole specialty. In addition they offer a field service that is made-to-order for the rancher who wants to forget his machinery. Their service provides skilled maintenance on schedule. Five servicemen are kept continuously on the road to check-out all Superior engines every 30 days for those who contract for the service. When the field men make their 30-day inspection of an engine, they give it a complete tune-up. Exhaust temperatures are read; oil, air and fuel flows are checked; and safety features are examined.

Engine business in irrigation pumping should take a big spurt as soon as word of the economy inherent in diesels gets around. The advantages are not recognized by many dealers and the engine manufacturers. As a result only a small percentage of ranchers are aware of the facts. Profitable farming is dependent on cheap water. The more cheap water available, the more extensive the farming operations. In many areas two crops a year can be grown. Economical, dependable gas engines provide the answer.

EASTERN DIESEL OBSERVATIONS

A COMMENTARY BY **ARNOLD B. NEWELL**

Arnold B. Newell, a third generation American, was born near Seattle, Washington of pioneer stock. He obtained his engineer's license at 21. Sailed as chief engineer on one of the first ocean-going motorships built in the U.S.A. In 1924 he joined New York Shipbuilding Company in diesel advisory capacity, tested and took to sea New York-Werkspoor diesels, supervised operation of shipyard owned vessels, then in 1927 joined Ingersoll-Rand as diesel field engineer. Became associated with "Motorship" in 1929. Subsequently became managing editor of "Motorship" and "Diesel Power," then vice-president and general manager.

Bunker "C" Could Solve Many Problems

NOT the most important outcome of the successful use of residual fuels in the so-called "locomotive type" diesel would be the re-establishment of diesel competition in the powering of big ships. From the viewpoint of general economy the impact upon the cost of operating trains would be tremendous. And ipso facto, the fuel cost of running all tugboats and the larger fishing vessels would drop almost 50%. In fact costs may be reduced even more because the oil companies have an over supply of residuals and the diesel or No. 2 fuel is in demand for other uses. It has valuable, extractable fractions that the petroleum industry would like to utilize more profitably. They would no doubt lower the price if more of the left-over were taken off their hands for use in diesels, thus releasing the better product for other uses. It is apparent that laboratory work on the burning of residual fuels in locomotives may turn out to be a stone that will kill several birds, among them being ocean-going ship propulsion with diesels.

The diesel has no contender for supremacy in powering tugs, towboats on the rivers, fishing vessels and in fact all commercial craft within the territorial waters of the United States except ore ships on the Great Lakes, which are like ocean-going vessels, able to keep fuel costs about 50% below the current level of diesel operation on No. 2 fuel oil. However, if the latter burns residual fuel the fuel cost differential becomes around 50% in favor of the diesel. Since this is a demonstrated fact dieselization of the merchant marine would seems to be imminent, but it is not so, for the use of low grade fuels is currently restricted to slow-speed heavy duty engines and in a general way its use in engines of the locomotive type is taboo.

Currently there is a substantial revival of big ship construction in which we find no diesels. In this country only two manufacturers build big slow-turning diesels for ocean ship propulsion, namely Nordberg and Baldwin-Lima-Hamilton. All very slow speed diesels direct connected to the propeller are heavier and the whole machinery installation is more bulky than a high-pressure, superheat, steam boiler and turbine installation. It is then apparent that to gain an advantage of about 50% in fuel cost by using engine types now capable to burning residuals, other sacrifices must be made that are distasteful to the ship owners.

For the sake of clarification we may establish the relative position, fuel cost-wise of the various forms of power now available for use at sea and on land. Starting with the lowest cost of fuel per horsepower and advancing to the highest cost the order is as follows: (1) pulverized coal; (2) residual fuel in the diesel; (3) Bunker "C" with superheat steam turbine; (4) diesel burning No. 2 fuel; (5) gas turbine and (6) atomic energy in present state of development. Only 2, 3 and 4 are up for marine consideration, although the government is experimenting with 5 and no doubt 6 will be tried in the near future.

To keep the records straight we may state unequivocally that the diesel has achieved complete dependability, low maintenance cost, high thermal efficiency, small bulk and weight per hp, low initial cost per hp and now, to make more progress it is necessary to reduce costs by using cheaper fuels. In this latter case an important stipulation is that low cost fuel most be burned in the type of diesel which has achieved all the desirable ends just outlined. This is the locomotive type engine available in units delivering up to 2400 hp each. There is no serious problem of hook-up by gear transmission or electrically for propulsion and maneuvering.

If the problem of burning residuals in these engines is solved we may expect a recurrence of the powering of ocean-going ships with diesels. It is unfortunate that the low-cost fuel problem has not been solved for use in the now popular locomotive type engine in time to profit by the current revival of ocean ship construction.

An example of the modern development of an engine suitable for future ship propulsion is the Alco turbocharged, 12-cylinder 1800 hp model 251 of 4-cycle vee-type first used in the new model 701 Alco locomotive. It is available in 16-cylinders with a continuous power rating of 2400 hp. Although there is no "family resemblance" this engine is a linear descendant of the McIntosh & Seymour acquired some years ago by the American Locomotive Company, now Alco Products, Inc. Few engines, steam or diesel, attracted more worldwide attention than the "Macs." I sailed as chief engineer of the motorship *Alabama* powered by the two first marine diesels of this make and then on the similarly powered Australian Commonwealth Government Line's *Challamba* and finally on the 1500 hp tanker *Brammell Point*, in which I made 56 trans-Atlantic crossings. All told these faithful engines carried me over ¼ million miles at sea. I ran across the nameplate of their stationary steam and diesel units in far places such as Lisbon, Saigon, Guyaquil and in near places such as Sleepy Hollow. In the great New York Shipbuilding Company yard I installed their engines and as a marine editor I attended trial trips with them from the Rockland Course to the Delaware Capes. From A. E. Ballin, the president, down the line to the field engineers I had friends in the organization. Upon visiting the shops in February I found I still have them. The connection with the past is human and very real. An accumulation of over 40 years of practical experience is reflected in the diesel refinements displayed at the Alco plant. Of prime importance are other connections with vast experience. Now Admiral W. D. Leggett, Jr., formerly Chief of the Navy Bureau of Ships has added his fund of engineering and diesel knowledge to the total. Somehow, we in the writing game became acquainted with the Admiral and he with us. When he could he helped make our reporting job easy.

RUSSIAN FISHING TECHNIQUES

Last month we commented regarding the devastating effect of imports of tuna which have idled existing vessels and stopped construction of new ones. Our chief fear had to do with Japanese fish imported to this country and the possibility of a resumption of poaching, admittedly somewhat more difficult than in pre-war days now that we have air patrol of coastal waters. The influence, one way or another, of Siberian fishing activities has not been taken into account in this country.

The United States is unlikely to let down the bars for any class of product from iron curtain countries. On the other hand Russia has its own system of economic self defense and in the fishing industry

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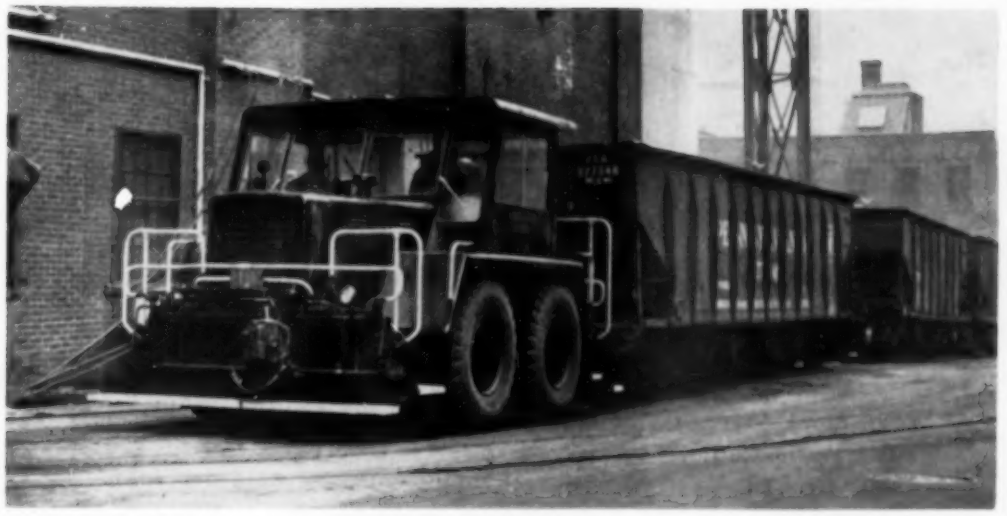


Coupling cars to the Switchmobile is standard railroad procedure as the unit is fitted with regulation A.A.R. couplers front and rear. A 208 hp GM diesel provides its power.

A NEW IDEA IN SWITCHERS

"Both ways forward" feature is accomplished by the use of pivoted controls which swing laterally from a pedestal located at center of cab.

Big flexible tires allow the Switchmobile to travel across tracks without damage to switches, ties or rails.

A further stride toward modernization of the Pennsylvania Railroad is in the form of a rubber-tired switch engine which climbs across tracks, travels on city streets and also pulls freight cars along the tracks like a locomotive. Le Tourneau-Westinghouse, a subsidiary of Westinghouse Air Brake Company, is the manufacturer.

Edward O. Boshell, chairman and president of Westinghouse Air Brake, in announcing the new "Switchmobile," built entirely to the specifications of the Pennsylvania RR, said it was the first machine of its kind. He added that the Switchmobile will speed switching operations and contribute to the easier and faster handling of the railroad's customers' cargoes. It will thus save time and money because of its unique ability to travel from assignment to assignment without the need of following on the rails.

A demonstration left little doubt as to the versatility and power of the Switchmobile. The machine moved easily about a crowded industrial area, picking up freight cars at different locations, pulling them to position as part of a "train" and then setting off quickly down a congested street for the next car. Because the Switchmobile runs on huge tires nearly as tall as a man (18:00 x 25), it can travel across tracks without damaging signal equipments, switches, ties or rails. A wheel gauge of 8 feet, 4½ inches allows it to straddle rails and run on ties as well as operating on pavement flush with rail tops when pushing or pulling cars. The low air pressure—less than that carried in the tires of a passenger car—enables the machine to operate over the ties without chamfering the ends or damaging them in any way. Thus, in any rail yard, the machine can take the shortest route across the yard to pick up a car for moving or switching.

The Switchmobile is equal in power to a 50-ton conventional switch engine, although it weighs less than 36,000 pounds. Equipped with a 6-cyl. GM 208 horsepower diesel engine, the all-wheel drive Switchmobile develops approximately 30,000 foot pounds of rimpull or tractive effort—enough to push or pull a gross weight of more than 1,000 tons from a standing start. Tests have shown that the machine can pull as many as eight loaded freight cars along the rails easily. A compact unit, the Switchmobile measures only 10 feet, 3 inches wide by 10 feet, 13 inches high. Its length from coupler to coupler is only slightly longer than a standard passenger automobile.

The Swtchmobile is a machine that never has to back up. It pulls or pushes with equal power and speed in either direction. To provide this feature its designers at Le Tourneau-Westinghouse have equipped it wth a special four-speed transmission which offers the same gear ratios in both directions of travel.

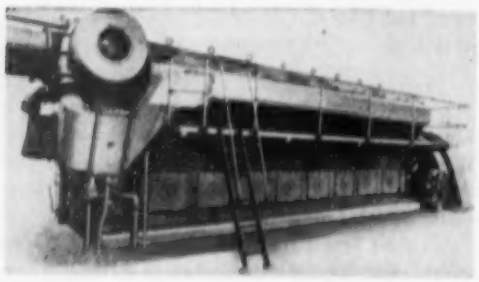
Coupling cars to the Switchmobile is standard railroad procedure, as the machine is fitted with standard couplers and air brake lines both front and rear. Compressed air, in addition to being used in the standard train braking system, is also employed for steering and braking in this unique dieselized vehicle.

WHAT'S GOING ON IN ENGLAND

CONDUCTED BY **BERNARD W. LANSDOWNE**

Bernard W. Lansdowne is an associate member of the Institution of Mechanical Engineers and is widely known among British and European diesel manufacturers as editor of our English contemporary "Gas & Oil Power." His early workshop training was spread over seven years with A.E.C., Ltd., Southall, following which he served some five years with that company's sales engineering department. He entered technical journalism as assistant editor of "Gas & Oil Power" in 1950 and was appointed editor in 1952.

IT IS just over three years since Mirrlees, Bickerton & Day, Ltd., introduced their K-series of diesel engines with five, six, seven or eight cylinders in-line and 12 cylinders in Vee-form. The range has now been further extended to include a 16-cylinder Vee design, which the manufacturers claim will be the largest engine in flow production anywhere in the world. With cylinder dimensions of 15 in. bore and 18 in. stroke, the new 16-cylinder design will be available in three forms. (A) naturally aspirated, type KV16, (B) turbo pressure-charged, type KVS16 and (C) turbocharged with air cooling, type KVSS16. The operating speed range is 200 to 428 rpm, and the ratings for the various models throughout the speed range are given in the table. At the maximum output figure quoted (4,128 bhp) the bmep is 150 lb per sq. in.



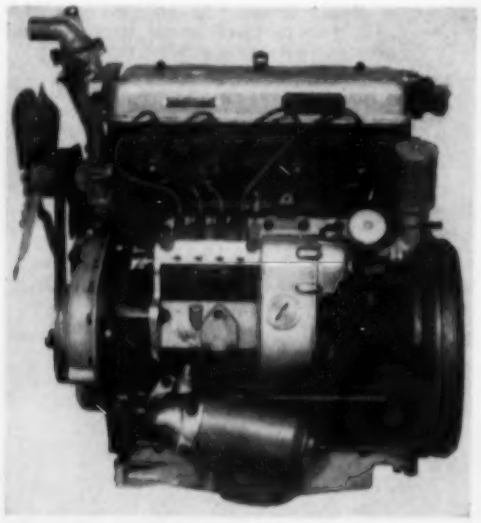
MIRRLEES K-SERIES RATINGS

	B.H.P.		
R.P.M.	KV16	KVS16	KVSS16
200	1024	1616	1920
225	1152	1824	2160
250	1296	2016	2400
300	1552	2432	2880
333	1728	2688	3200
360	1856	2912	3472
375	1936	3040	3616
400	2048	3232	3840
428	2208	3456	4128

NEW RANGE OF INDUSTRIAL ENGINES

One of the most widely used small diesels manufactured in Great Britain is the four-cylinder, 2.1 litre design of the Standard Motor Co., Ltd., Coventry. It is used extensively as the power unit on the Ferguson tractor and many hundreds are fitted in London's taxi cabs; the design was described in detail in DIESEL PROGRESS, May 1954

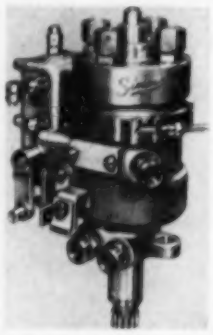
News has now been released of an agreement between the Standard Motor Company and Auto Diesels Ltd., of Uxbridge, England, whereby the latter will manufacture and market a new range of industrial power units utilizing the Standard Company's diesel prime mover. The mass production facilities of the Standard Company—they are one of Britain's big five motor manufacturers—enable them to produce their diesel engine at a very low cost and the new range of equipment now offered by Auto Diesels will retail at a very competitive price in world markets. A further advantage under the agreement will be the availability of Standard's existing worldwide service organization which, allied to that of Auto Diesels, will provide the vital service-after-sale facilities demanded by present-day customers.



The new range of engines will be marketed under the name "Stad Industrial Engines," and the series will include, in addition to the diesel-powered sets, units using petrol, vaporizing oil and natural gas-burning prime movers. For the industrial applications now envisaged, the 2.1 litre Standard diesel engine will be rated at 26 bhp at 2,000 rpm on a 12-hour basis. It will be recalled that the design incorporates Freeman Sanders combustion arrangements with C.A.V. injection equipment and A.C. lift pump. Purolator filters are fitted in the fuel and lubricating oil circuits.

A number of the new industrial applications to be marketed by Auto Diesels are illustrated and among the additional equipment which can be supplied with the engines, if required, are a detachable flywheel housing fitted with adaptor ring to S.A.E. standards, and an over-centre type automotive clutch with extended shaft for power take-off. Either three-point or four-point engine mountings are available with or without a bedplate and instrumentation can also be supplied comprising oil pressure and oil temperature gauges, an ammeter and an rpm/service-hours counter.

SIMMS DISTRIBUTOR PUMP



It is reported that a distributor-type injection pump will "soon be manufactured in England" is given in a recent publication by Simms Motor Units Ltd. The publication, entitled "The Simms Story," is an historical record of the company's development from 1891 onwards, and reference to the distributor-type injection pump is made in a section of the book which discusses the co-operation between Simms and the American Bosch Corporation.

Simms now have the British manufacturing rights, under American Bosch patents, while the U.S. company enjoy the rights to manufacture Simms products in America. Under the arrangement, Simms are now permitted to produce all new types and sizes of fuel injection equipment, identical to the American Bosch range, but major interest centers on the small distributor-type injection pump soon to be available in Great Britain.

The Simms distributor pump has an integral mechanical governor and feed pump, and is of compact dimensions. A shank mounting system is used and injection characteristics are similar to those of the normal spill-control in-line pump, but higher injection rates and higher operational speeds are claimed to be possible. An automatic injection device can be incorporated without increasing the size to any considerable degree and with the higher engine speeds contemplated, an automatic advance system would have to be fitted.

The Offshore Company No. 3 being towed to location from Alexander Shipyard, Inc., where she was built.

OFFSHORE RIG NO. 3

By JAMES W. CALVERT

WITH two movable drilling platforms and a submersible barge in operation and two huge platforms under construction, The Offshore Company of Baton Rouge, La. has taken the lead in the offshore oil drilling picture in the Gulf of Mexico. The Offshore Company, owned by J. Ray McDermott & Co., Southern Production Company and the DeLong Engineering Company, recently began drilling operations with the Offshore No. 3, a 200 x 74 ft. submersible drilling barge, and announced that two platforms are soon to be completed at the U.S. Steel shipyard in Orange, Texas.

The completely dieselized Offshore No. 3 is the only submersible unit operated by the company and it utilizes the famous DeLong jacks for stabilizing rather than supporting the structure on the ocean bottom. Completed in December at Alexander Shipyard in New Orleans, the barge began its 1st well for the Sun Oil Company in an offshore location in the Gulf off the Louisiana coast.

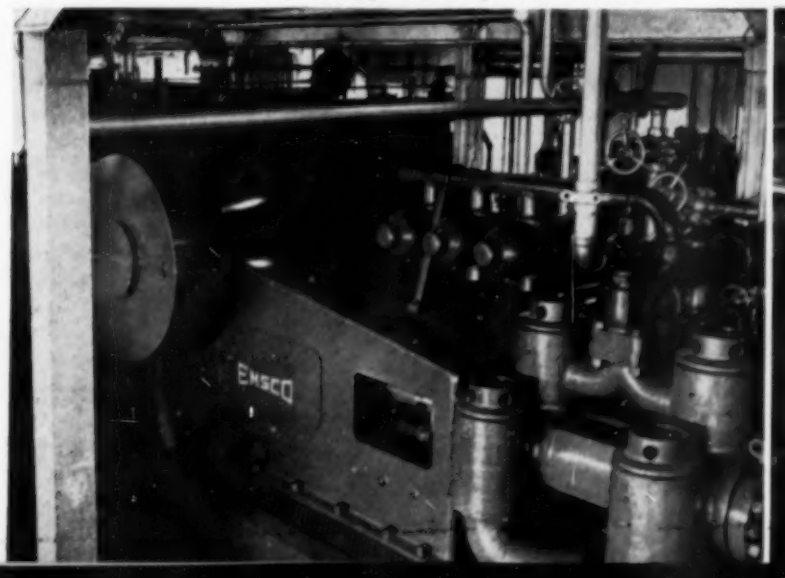
The Offshore No. 3 differs from the other two Offshore rigs in that it is a submersible barge, supporting a drilling platform on 23 fixed tubular columns 52 feet above the barge deck, and is designed to drill in water up to 35 feet in depth. The other Offshore Company rigs are platforms supported on spuds or steel pilings, and are designed to operate in water up to 100 feet in depth.

Main power of the rig is a three-engine compound, consisting of Superior model PTDS-8 diesel engines having a total power rating of 2010 hp, powering two Emsco D-850 mud pumps through Ideal Gyrol fluid drives. Auxiliary power is supplied by two Caterpillar D397 diesel generators. There are two Mechanical Equipment Company 600 gal. per hour distillation units. The drilling platform, completely self contained, consists of a cellar deck drill floor, pipe rack, air conditioned living quarters, and storage facilities for mud, cement, drilling water and fuel. The drilling platform is equipped with a National Supply Ideal 130E drawworks, complete with auxiliary brake, catheads and core reel with drive. Elliott Electric generators drive the drawworks and rotary.

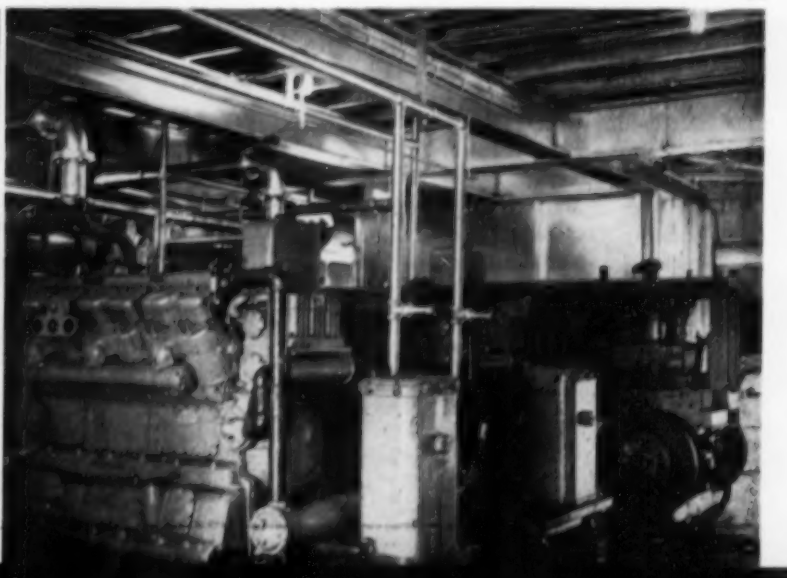
The drilling slot is 25 ft. 11 in. wide and 36 ft. 2 in. long. Equipped with a 140-ft. Lee C. Moore derrick, the rig has a drilling capacity of 16,000 feet. Other oil drilling equipment includes a Rhumba double shale shaker, a Halliburton unit, a Slumberger unit and Lightning mud mixers.

The two Offshore drilling platforms now under construction are similar in design to Offshore No. 1 and Offshore No. 2 in that they will be mobile structures wholly supported by eight legs, or steel piles. The new platforms will be slightly smaller than the two now in operation, being 104 ft. wide x 200 ft. long, and will be supported by eight legs instead of 12 for Offshore No. 1 and 14 for Offshore No. 2.

One of the two Emsco D-850 mud pumps on the Offshore Company's new submersible drilling barge. Power is supplied by a three engine compound composed of Superior diesels with a total power output fo 2010 hp.



These two Caterpillar model D397 diesel engines power auxiliary generators aboard the Offshore Company barge No. 3.



AUTOMOTIVE DIESEL PROGRESS

A COMMENTARY BY **MERRILL C. HORINE**

Merrill C. Horine, for 38 years a member of the Society of Automotive Engineers, has been actively engaged in automotive engineering, sales promotion and training, advertising and editing of automotive publications since 1907. He has contributed numerous papers on diesel and allied subjects to the SAE and other organizations. An officer in the Air Service in World War I, he was a consultant to the Chief of Ordnance and the Automotive Division of the War Production Board in World War II.

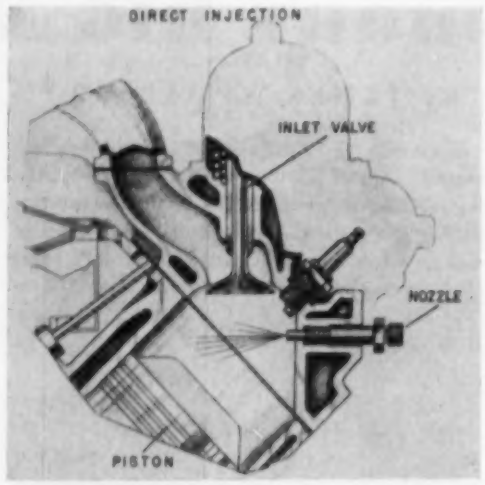
How About Gasoline Injection?

RIVALRY between the gasoline and diesel engines may be expected to continue for many years to come, so far as the automotive field is concerned, with the diesel leading in fuel economy and sustained torque characteristics and the gasoline engine in power, smoothness and quiet. Diesel designers strive constantly for greater specific output, smoother running and reduced noise, while gasoline engine designers are untiring in their efforts to improve economy and torque characteristics.

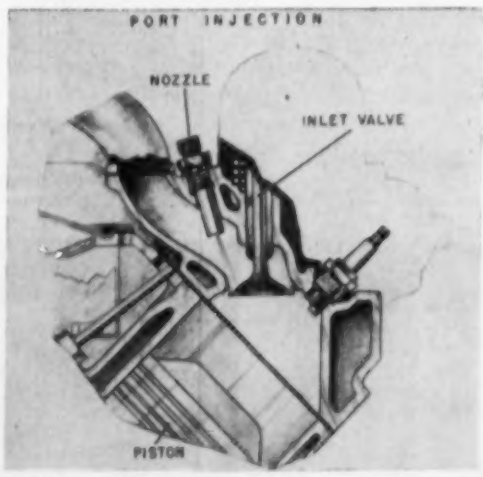
Presently, the latter coterie looks to gasoline injection to bring their products closer to diesel standards without sacrifice of the virtues of the gasoline engine. This naturally raises the question whether successful developments along these lines will not narrow the advantages in exacting service which the diesel enjoys. Gasoline injection is by no means new, either here or abroad; but the fact that progress has been so slow in the face of its many demonstrated advantages is an indication of the seriousness of some of the difficulties encountered. Undoubtedly sufficiently practical solutions to these problems will soon be forthcoming to permit gradually increasing commercial development of engines of this type.

So far as can be anticipated at this time, however, such improvements in the operating characteristics of gasoline power plants as result will by no means threaten the growing popularity of the diesel in the truck, tractor, stationary and marine fields. Progress in diesel development will certainly continue, so that it will present a moving target for the gasoline engine to aim at. Moreover, and more significantly, the diesel cycle embodies inherent advantages which a mere change in the method of introducing the fuel into the air of the gasoline engine cannot match.

Fundamental among these is the broad range of air-fuel ratios which the diesel tolerates owing to compression ignition and full breathing at all loads, its successful operation at high compression pressures and the non-explosive nature of its fuel. The latter, of course, is of small consequence except where the engine is operated in a confined space, as below decks in a boat or in a stationary engine room.



Two methods of gasoline injection, top directly into combustion chamber; bottom, into intake valve ports— ***From paper by E. E. Miller, "Automobile Gasoline Injection," courtesy Society of Automotive Engineers, Inc.***



The gasoline engine's Otto cycle necessitates a narrow range of mixture ratios, with control by throttling. It restricts compression pressures below those at which auto-ignition can occur and necessitates the use of a highly-volatile fuel. To match the diesel's thermal efficiency, the gasoline engine would have to operate at more nearly the same compression pressures and maintain such pressures throughout its range of operation. This is clearly incompatible with throttle control and spark ignition. Only a diesel can operate like a diesel.

While physically some gasoline injection systems strongly resemble those used by diesels, they are functionally different, since injection must be of long duration to insure thorough mixing with the air. This is necessitated by the fact that ignition is by electric spark, starting at a point and progressing through the volume of compressed gas. Compression pressure is no less limited in the gasoline injection system than with the carburetor, namely just short of auto-ignition. Air temperature at the moment of ignition is much lower than in the diesel and hence the mixture is less inflammable. Homogeneity of the mixture is thus far more vital.

Also, because the mixture ratio must be confined within a narrow range—say from 13 to 1 at the rich end to 15 to 1 lean, control cannot be effected, as in the diesel, by fuel metering alone; but must depend principally upon air metering or throttling. Greatest thermal efficiency is attained when compression pressure is at its practical maximum. Thus, in the gasoline engine, regardless of the fuel system employed, thermal efficiency varies widely from a maximum at peak mean effective pressure, e.g., wide-open throttle at approximately torque peak speed to a minimum under severely throttled conditions. Diesel compression pressure and hence thermal efficiency can be maintained much more uniform throughout its operating range because there is no throttling and hence volumetric efficiency is sustained.

. . . and now please turn to page 74 . . .

Florida Diesel News

By Ed Dennis

A BUDA 235 hp diesel for main propulsion on the 82 ft. *King Fish*, built by Williston Boat Works of Williston, N. C., for the King Fish Bait Co. A 10 kw Buda diesel generating set was also included in the engine room.

CAPELETTI BROS. CONTRACTORS of Hialeah, received a General Motors 6-71 diesel with a Cotta 2.65:1 r&r and clutch model SR-10-A from Square Deal Machinery & Supply Co., Orlando; installed in a Northwest 1-yd. dragline.

A MODEL 49B4½ Fairbanks-Morse diesel engine for the Fletcher Co. Inc. of Greensboro. This 3-cyl. diesel is rated 90 hp.

QUEEN of the Miami International Motor Boat Show was the 61-ft. *Floridian*, powered with twin G. M. 6-71 diesels, followed closely by the 55-ft. *Columbia*, with twin G.M.'s and the 40-ft. Feadship express cruiser with twin 150 hp Hercules diesels.

FLORIDA-GEORGIA TRACTOR CO. delivered to C. T. Stockton the largest motor roller in the world, a T700 Galion, for use in the construction of Florida's bobtail turnpike. Powered with a model HRMBI 600 Cummins diesel and an Allison Torqmatic drive, it weighs 42,000 pounds.

DIESEL ENGINE SALES, of St. Augustine, delivered the *Queen Anne II*, powered with a D342 Caterpillar diesel and Twin Disc 3:1 r&r gears to Charles Ludwig, to fish out of the Fernandina Beach area. Also the *Miss Delta*, with the same engine room specifications to Doro Besteiro.

FOR PORT AU PRINCE, HAITI, and the Haytion Tractor Co., one D8 and one D7 Caterpillar tractors and Caterpillar's new D9 tractor.

A 1040 HP ENTERPRISE diesel engine will provide pumping power for the second dredge being built by Dade Drydock Co. for Seward Dredging Co., a model D. S. G. 6 Enterprise rated 575 hp will be used for the 500 kva Westinghouse generator.

GENERAL ENGINE AND Equipment Co., Tampa, repowered from a gasoline engine to a General Motors 3-71 diesel, a Koring dragline for the Florida Dolomite Co. of Sarasota.

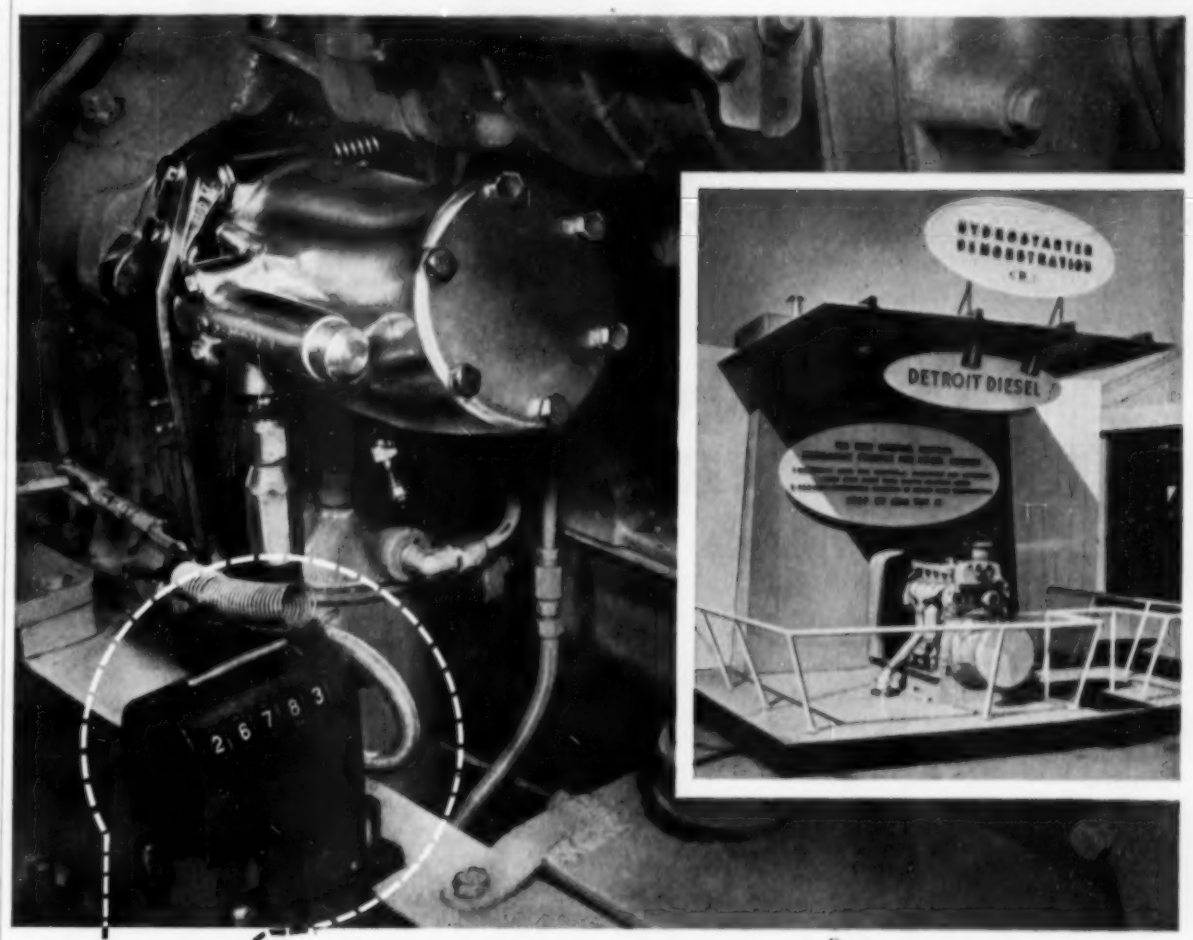
CUMMINS diesels were installed in an RD202 International Harvester hi-way tractor, model JBS 600 for the U. S. Gypsum Co. and an NHB 600 for H. C. Baker in an H6IT Mack; both firms are in Jacksonville.

A FORDSON MAJOR DIESEL with a Simms governor and fuel pump for power on a Shermain power digger and loader, also equipped with a model 54C-600 actuated shovel on Arthur V. Davis' Old Cutler Road housing project.

FOR THE HOLLYWOOD SEWAGE Treatment Plant, a model 6DAS6-844 supercharged 262 hp Buda diesel with a Allis-Chalmers generator rated 150 kw at 1800 rpm, radiator cooling; from Peninsular Armature Works Inc.

A TD 24 INTERNATIONAL Harvester bulldozer for the William Development Co., of West Palm Beach, and a TD 18 International tractor for the Palm Beach County; sold by Florida Georgia Tractor Co., Miami, Florida.

THE BUDA DIESEL DIV. of the Allis-Chalmers Mfg. Co. announced the following dealers: Florida Equipment Co. of Jacksonville, Miami, Orlando and Tampa for their Automotive-Industrial equipment.



26,783 Starts in 26 days at GM Powerama!

(and the total is still growing at the GM Motoramas!)

HERE'S PROOF of the rugged dependability of a General Motors Hydrostarter—the new, low-cost hydraulic starting system now available on all GM Detroit Diesel engines:

On public demonstration at the GM Powerama, a Hydrostarter started a GM Detroit Diesel 26,783 times in 26 days—an average of more than 1,000 starts per 12-hour day—more than 1 start every minute.

A Hydrostarter gets a GM Detroit Diesel up to starting speeds 80% faster than regular starting systems—costs less to maintain than electric starters—sells for a far lower price than any other non-electric Diesel starter.

And it gives you fast, sure starts—even at sub-zero temperatures, or when your equipment has been standing idle for long periods of time.

Call your GM Diesel Distributor for full details on the GM Hydrostarter—or write direct for more information.

DETROIT DIESEL

Engine Division of General Motors

Single Engines . . . 30 to 300 H.P.
Multiple Units . . . Up to 893 H.P.

America's Largest Builder of Diesel Engines

The 500 kw Canadian Mobile diesel generating set as it was leaving for the interior of British Columbia.

CANADIAN MOBILE DIESEL GENERATING UNIT

TWO 500-kilowatt mobile diesel generating units—first of their kind in British Columbia's electric utility business—have been purchased by the B. C. Power Commission. The mobile units, actually powerhouses on wheels, will increase reliability of service throughout the Commission's widespread system. They will be available for emergency use or to meet seasonal peaks at various locations.

The 35-foot long trailers which house the diesel units can be hauled by tractor trucks or loaded on rail cars for immediate dispatch to any part of the province. They will be used to supplement power production from any of the 19 diesel stations operated by the Commission, or to provide essential power in the event of a breakdown or other emergency in any plant. On occasion, they may feed into hydro system during temporary critical water periods. They will be available to other utilities if required.

A significant feature of this innovation in the power field here is that the mobile units were designed, fabricated and assembled in B.C. They are the largest of the road transportation type ever to be built in Canada, and have as large a generating capacity as any other mobile unit "on rubber" on the continent. They have the unique feature of being able to supply power at three different distribution voltages without the use of transformers. Designed to specifications of B.C. Power Commission engineers, the units are completely self-contained. Though they normally will operate at diesel plants which have large fuel storage facilities, they carry enough fuel themselves to run at full load for about 24 hours.

The "itinerant powerhouses" are fully equipped with auxiliary lighting plants, floodlights, fire-fighting equipment and tools. Trailer lighting and heating are automatically transferred to the auxiliary lighting plant when the main unit is shut down. The trailers are 35 feet long, eight feet wide and 12 feet high and are adaptable to towing by either single or tandem axle tractor trucks.

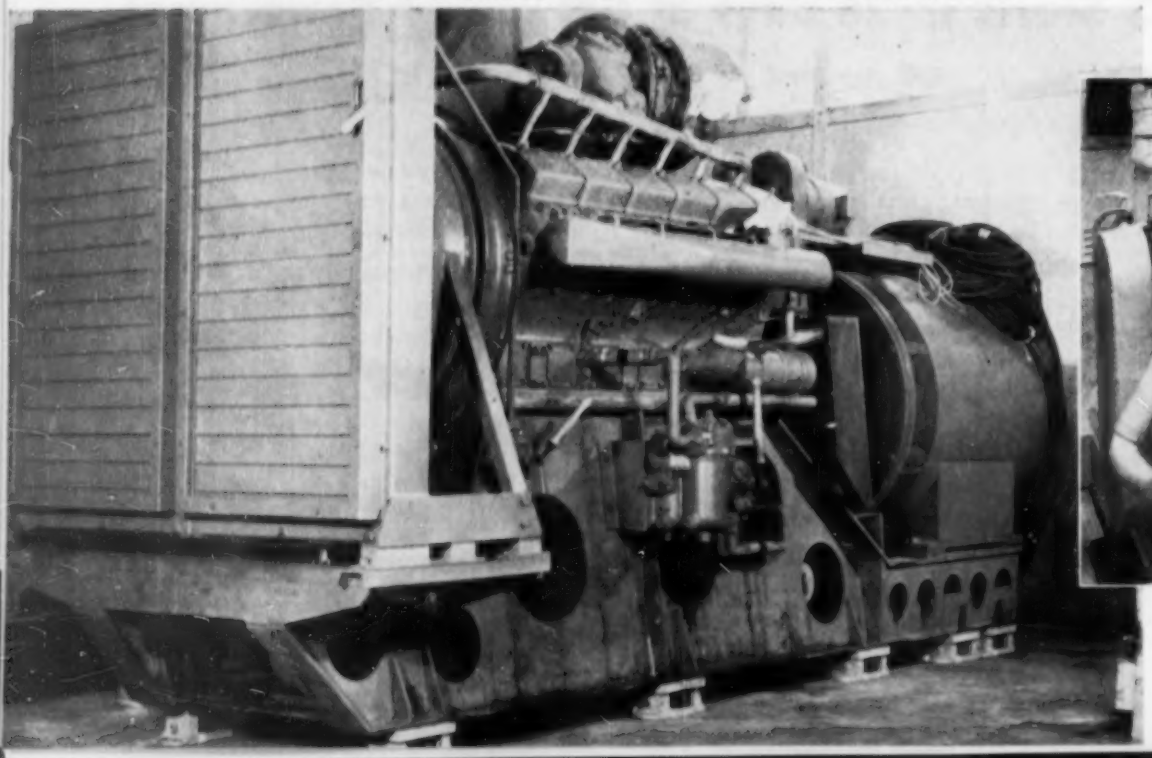
Auxiliary power is provided by a 7.5 kw Onan 60 cycle, single phase generator powered by a Model 2BD-77 2-cyl. 4-cycle Buda diesel engine. This unit is used for preheating the main engine in sub-zero weather. (The main engine has heating elements in the lube oil crankcase.) It is also used for station lighting and for charging the batteries of the main and auxiliary engines.

British Columbia firms had major roles in supplying this latest advance in the utility field. The entire job was co-ordinated by Maxwell-Simson Ltd., of Vancouver, which also installed the engines and assembled equipment in the big trailers. Willock Truck Equipment Co. Ltd., Vancouver, fabricated the trailer bodywork, and Cemco Ltd.'s Vancouver branch supplied the switchgear. The diesel engines are Mercedes Benz, 12-cylinder V-type, developing 730 bhp at 1,200 rpm. The Canadian General Electric generators are reconnectable at 2,400, 4,160 or 12,480 volts, making them adaptable for use in any of the Commission's 29 power districts.

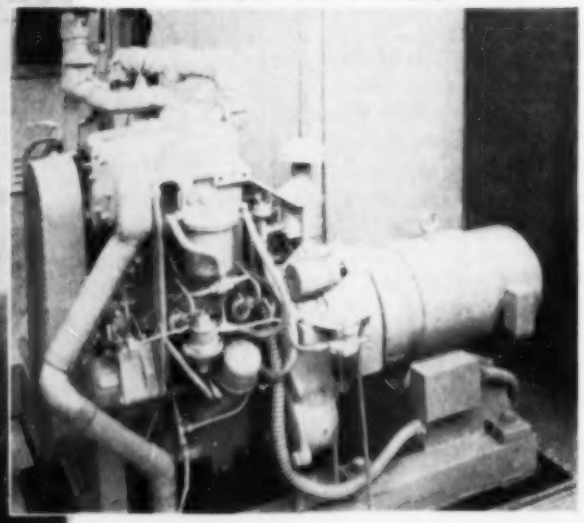
The mobile generating units have proven a great boon to electric utilities elsewhere. Their advent in B.C. is another step in the Power Commission's job of service to more than 60,000 customers.

Main power is provided by a Mercedes-Benz diesel generating set. It is a 12-cyl., 4-cycle engine direct connected to a Canadian General Electric, 500 kw. generator. Vibration if the package is minimized by the use of Korfund vibration dampeners.

The complete 500 kw power package before installation in the trailer. The engine is a Mercedes-Benz diesel, 12 cyl., direct connected to a Canadian General Electric generator.



The Model 2 BD-77 Buda diesel direct connected to an Onan 7.5 kw generator. The unit provides auxiliary power for warming up the main engine, lighting and battery charging.



West Coast News

By James Joseph

SOLD TO SEA BOAT CO., Costa Mesa, Calif., a Fairbanks-Morse 45B3½, 5¼ hp basic engine.

FOR CALIFORNIA DIVISION OF Highways' new ferry to operate across Straits of Carquinez (between Benicia and Martinez), a Union Model P8 supercharged marine diesel.

FOR POWERING AN air compressor, Yakima Sewerage Disposal plant, Yakima, Wash., has taken delivery of a Buda 8DA-1125.

PACIFIC INTERMOUNTAIN Express has adapted to its new Kenworth-built, P-I-E-engineered dual-front-axle tractors (20 now on order) the turbocharged Cummins "pancake" NHHT diesel, developing 250 hp.

SOLD TO SAN DIEGO'S James Cowan, a Fairbanks-Morse Model 45B4½, 10½ hp engine.

THREE FAIRBANKS-MORSE 31A8½, 270 hp. diesel generator sets have been delivered to Morrison Knudsen Co., Anchorage, Alaska. Engines are 6-cylinder.

SWEETHOME, Oregon's McCalley Logging Co., has repowered a model 955 P&H 2½-yd. shovel with a Buda 6DCS-844, rigged with Western Gear torque converter.

FOR WEST LOS ANGELES' Leich Sales Corp., a Fairbanks-Morse model 49B4½, 180 hp engine.

LUCAS BROTHERS, Sweethome, Oregon, has repowered a 304 Koring ¾ yard machine with a model 6DA-779 Buda, a switch from gas to diesel power. Engine operates at 1600 rpm.

HONOLULU'S P. S. PELL & CO. has taken delivery of a Model 45B3½ Fairbanks-Morse generating set, 5¼ hp.

ANOTHER F-M SALE: to H. A. Drees, Petaluma, Calif., a model 49B4½, 126 hp Standard Enclosed Power Unit.

LOS ANGELES' BEVERLY Equipment Co. has purchased a D311 Caterpillar 20 kw, trailer-mounted generator set, complete with combination generator control panel and power outlets, for operating saws on building projects.

SHEPHERD MACHINERY CO. announces sale of a D375 Caterpillar marine engine with 3:1 Snow and Nabstadt reverse and reduction gear, installed on purse seiner *Betsy Ross*, in San Pedro, Calif.

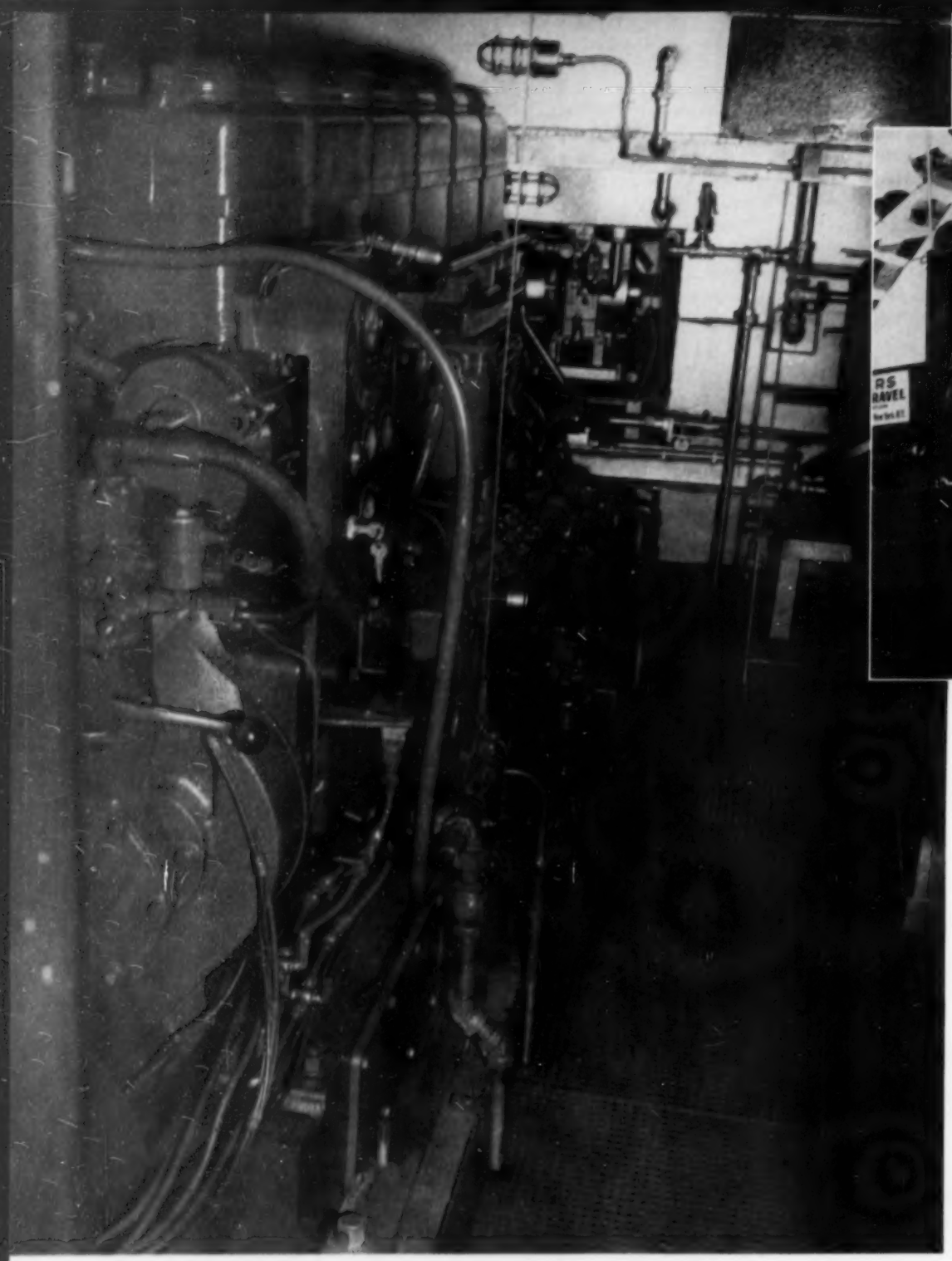
FOR SUPPLYING ELECTRICITY to a village near Magdalena, Sonora, Mexico, a Caterpillar D8800, 50 kw diesel electric set, single phase.

Regional Manager

The appointment of W. M. Stead as regional manager, Southwest Region, with offices in Los Angeles, has been announced by L. E. Williams, manager-distributor, Cummins Engine Company, Inc., Columbus, Indiana. Mr. Steed is a graduate of Purdue University and he has been associated with Cummins since 1951, when he joined the diesel manufacturer as a sales engineer. Prior to his recent appointment, he was a regional representative, Central Region, with offices in Chicago. In Los Angeles, Mr. Steed's headquarters are at 1101 Equitable Life Building, 411 West Fifth Street. The Cummins Southwestern Region consists of the states of California, Arizona, and Nevada.

If you want to know how oval rings will work in a round cylinder, try stowing the spares on edge for a year or two.

"20 Diesels Get Up To 225,000 Miles Before Overhaul With Cities Service C-300 Motor Oil!"
"We don't even have to grind the valves before then," reports Holdcraft Transportation Co., Sioux City, Iowa.
CITIES SERVICE
QUALITY PETROLEUM PRODUCTS



Christening the *Jim Steers*. Young Jim Steers is guided in his bottle swinging effort by Mrs. Richard Steers while guests look on.

View of the engine room showing the LRM Cummins 300 hp diesel engine. A Curtis-Keel engine mounted air compressor provides air for starting and the Snow-Nabstedt 3:1 reduction gear. The 6-cyl. Cummins has four Purolator fuel filters and a Luberfiner lube oil filter.

DIESEL TUG "JIM STEERS"

A 300 Hp Cummins Engine Powers This 40-Ft. Tug for Feeding Empty Scows to The Hopper And Towing Filled Barges To The Stake Boat

OPERATING out of Northport, Long Island in New York, the new tug *Jim Steers* boasts a 6-cyl. Cummins diesel which develops 300 hp at 900 rpm. Rand-McMurray, Cummins distributor for the area, installed the LRM Cummins. Ben Cairo, superintendent of Steers Sand & Gravel, owners of the craft, said that it is feeding empty scows to the hopper and towing filled barges to the stake boat in Northport Harbor.

The *Jim Steers* is 40-ft. long, has a 15-ft. beam and draws 6 ft. 6 in. of water. A 12-volt system provides for the lighting and radio operation. A Curtis-Keel engine mounted air compressor supplies air for starting and for the Snow-Nabstedt 3:1 reduction gear. Four Purolator fuel oil filters, a Luber-finer lube oil filter and a Donaldson dry air intake filter are part of the accessories. The fire and wrecking pump is a 300 gpm Trench Marine powered by a Waukesha engine.

The *Jim Steers*, which was launched late last year, was designed by L. Van Houten of J. Rich Steers, New York City. The vessel was built under his and Ben Cairo's supervision at the J. Rich Steers Sand & Gravel Yards at Northport.

New Worthington Division

Hobart C. Ramsey, chairman of Worthington Corporation, and Eldon Macleod, president of the Mason-Neilan Regulator Company of Boston, Massachusetts, have announced an agreement for the transfer of the net assets, name and goodwill of Mason-Neilan to Worthington in exchange for Worthington common stock. The agreement was scheduled to go into effect on or about March 30.

Mr. Ramsey stated that the Mason-Neilan plant and facilities would be operated as the Mason-Neilan Division of Worthington, and that the entire working force and management staff will be continued in their present positions.

The merger will unite two leading manufacturers in complementary fields. Mason-Neilan control valves and regulators, in conjunction with Worthington pumps, compressors, turbines and other types of industrial machinery produced by Worthington, are effectively used in automatically controlled production systems. The full line of Mason-Neilan products will continue to be manufactured, including instruments and valves designed to control the pressure, temperature and flow of the liquids, gases and components incident to industrial processes. Among them are indicating, controlling and recording instruments, flow meters, diaphragm control valves, servomotors, pressure regulators, pump governors, filters and other specialties.

In its twenty-nine plants, seventeen of them in the United States (not including the Mason-Neilan plant) and twelve of them located in foreign countries, Worthington manufactures pumps and pumping machinery for every industrial need, air and gas compressors, steam power plant equipment, steam turbines, generating units, diesel and dual-fuel engines, mechanical power transmission equipment, electric generators and motors, construction equipment, liquid meters, welding positioners, and air conditioning equipment for industrial, commercial and residential use.

Generator for Suburban Trains

The recent installation of Nordberg Power Chief diesel generator sets on the long suburban trains of the Chicago, Milwaukee, St. Paul and Pacific Railroad assures commuters in the Chicago, Illinois area of adequate and uniform lighting. The cars now draw their electrical energy from a Power Chief generator set and are independent of the generator in the locomotive. The independent generator provides the additional power required to adequately light the longer trains. In addition, the independent generator set enables the conductor to turn on the lights before the locomotive is coupled to the suburban cars.

The two cylinder Power Chief diesel generator set produces 15 kw of 75 volt dc power, which is sufficient power to light fourteen suburban cars. In a 14 car train, there are about 275 seventy-five watt lamps, plus smaller bulbs in each vestibule. Thus only one generator equipped car is needed for each commuter train.

The engine-generator set, a switchboard and a 100 gal. fuel tank which is filled from the outside, are located in a compartment at one end of the car. The engine rests on shock absorbing mounts that both protect the engine from shock and also protect the passengers from feeling any engine vibration. The compartment is also insulated against sound so the engine is inaudible when the train is in motion.

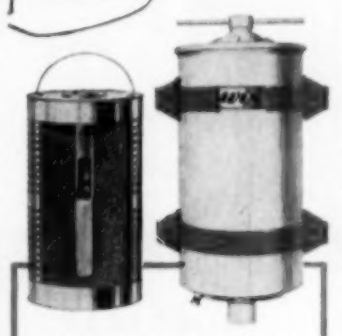
Several of these Nordberg diesel-generator equipped cars are being placed in service by the Milwaukee Road to provid adequate and uniform lighting for their suburban passengers.

...AND IN DIESEL OIL FILTRATION

Whatever your Diesel filtration problem, WIX Engineering, Research and Development provide the right answer with slide-rule precision. The complete WIX Line includes Oil Filters and HEVI-DUTY Cartridges for every filter-equipped Diesel engine...on construction equipment, trucks and buses, marine, railroad and stationary engines —for fuel or lubricating oil.

Tested WIX Filtrants keep oil cleaner for longer periods. WIX Engineered Cartridge construction assures precise fit and ease of installation. Extensive laboratory facilities, constant field testing and accumulated know-how of many years' experience are your guarantee of the utmost in efficient, economical filtration.

Let WIX Engineering solve your Diesel filtration problems! Write today for the complete WIX Catalog of Filter Cartridges for Fuel or Lubricating Oils... or for the assistance of WIX Filtration Engineers.



Large-Capacity Filters, including the WF-750 with bar-type cover handle for heavy duty applications — eliminates troublesome cover bolts, speeds cartridge changing.

Can and Sock-type Cartridges for fuel and lube oil filtration — Filtrant is density-packed in rust-proof metal can or one-piece, lint-free cotton sock.

Prescription-type, HEVI-DUTY Filtrants: Flock-type SPECIAL BLEND for Diesel fuel and lube oil, Resilient Density WIXITE for by-pass systems, choice of Premium WIX-KNIT or Pleated POROSITE for full-flow systems.

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Gulf Coast Diesel News

By Michael T. Pate

HIDALGO AND WILLACY Counties Water District Number 1, Edcouch, Texas, has bought from Stewart & Stevenson Services, Inc., of Houston, two General Motors series 71, model 3030C, 3-cylinder diesels which will be used to drive pumps in irrigation service.

SABINE PROPELLER AND MARINE Service Company, Port Arthur, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, a General Motors diesel, series 71, model 2031C. The 2-cylinder engine is rated 34 hp at 1200 rpm.

EL INDIO GIN COMPANY, El Indio, Texas, has secured through Stewart & Stevenson Services, Inc., Houston, a General Motors series 110, model 122403 twin-six diesel which will be installed as drive in the company's cotton gin.

HOUSTON OIL FIELD MATERIAL COMPANY, Houston, has bought from Waukesha Sales & Service, Inc., Houston, a model 135DKU Waukesha diesel, rated 106 hp at 1800 rpm. The diesel will power one of Homco's service units.

HIGMAN TOWING Company, Orange, Texas, has bought a General Motors series 71, model 6030C 6-cylinder diesel. The engine will be installed on an oil barge and will power the main barge pump.

JACK NEILSON, INC., Harvey, Louisiana, will power his 65-foot towboat *Duke*, with a series 110, model 12203 tandem twin-6 General Motors diesel. The drive will be through a 4:1 hydraulic reduction and reversing gear. The equipment was furnished by Stewart & Stevenson Services, Inc., of Houston.

BROWN & ROOT, INC., general contractors of Houston, have bought through Big 3 Welding Equipment Company, Inc., of Houston, four 300 amp. Lincoln welding generators, each powered by a two-cylinder series 71, model 2055 General Motors diesel.

NATIONAL SUPPLY Company, Houston, has bought from Mustang Tractor & Equipment Company, Houston, a Caterpillar model D-311 diesel electric generator set. Operating at 1800 rpm, with Caterpillar constant voltage control, this unit will serve as utility power on an oil-well drilling rig.

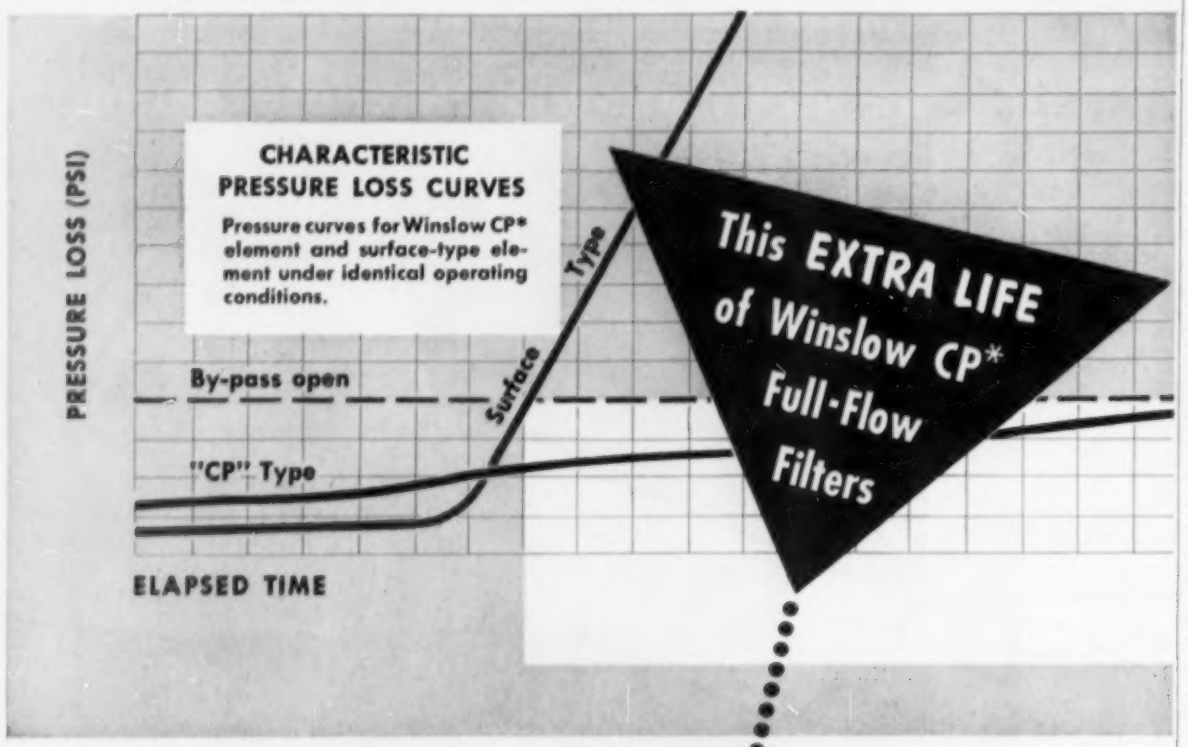
UNIT RIG & EQUIPMENT Company, Tulsa, Oklahoma, has bought from Stewart & Stevenson Services, Inc., Houston, two General Motors series 71, model 2410B quad-6 diesel power units, each developing 800 hp., which the company will use to power one of their rigs.

ALONZO GOTT, Hardin, Texas, has bought from Stewart & Stevenson Services, Inc., Houston, a series 71, model 4030C 4-cylinder General Motors diesel with which he plans to drive a portable sawmill. The diesel is rated at 90 hp.

PIONEER CENTRIFUGE COMPANY, Houston, has bought through Waukesha Sales & Service, Inc., Houston, a model 195DLCU Waukesha diesel rated 76 hp. at 2000 rpm, which will be used in the company's plant.

IDECO DIVISION, Dresser Industries, Beaumont, Texas, has purchased a Stewart & Stevenson model 2GD21C A.C. generating set developing 20 kw. and powered by a General Motors 2-cylinder series 71, model 2030C diesel.

PARKER BROS. & COMPANY, Houston, is installing on its shell dredging rig a model 12GD175 Stewart & Stevenson ac generating set which is driven by a heat-exchanger cooled twin-6 General

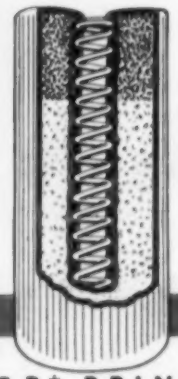

CHARACTERISTIC
PRESSURE LOSS CURVES
Pressure curves for Winslow CP* element and surface-type element under identical operating conditions.
PRESSURE LOSS (PSI)
By-pass open
Surface Type
"CP" Type
ELAPSED TIME
This EXTRA LIFE of Winslow CP* Full-Flow Filters

Saves both the Oil and the Engine

Laboratory tests and operating experience indicate that Winslow CP* filters have as much as 50% more useful life than a surface-type filter. As a result, both the lube oil and the engine are protected beyond normal filter service.

Contractors, for instance, report that useful oil life in diesel-powered equipment has been extended from 80 hours to 300 hours, with Winslow CP* filters.

Most important, engines are protected all the time with Winslow full-flow filtration . . . protected during cold starts, while idling and against excessive dirt . . . protected if a bearing fails. Because of this better oil filtration, engines last longer and require less maintenance. A modest investment in Winslow filters returns substantial dividends.



THE CP* PRINCIPLE

Winslow patented CP* (Controlled Pressure) elements are designed to continuously self-adjust the pressure within the filter and allow for a full stream of filtered oil from the filter without opening by-pass valves. This is accomplished through the dual flow capacity, with two types of material, as illustrated.

WINSLOW FILTERS **CP is fully protected by patents and trademarks*

W-56-1 **Winslow Engineering Company** 4069 Hollis Street • Oakland 8, California

Motors diesel, series 71, model 12105. The set is rated at 175 kw.

HOUSTON OIL FIELD Material Company, Houston, will drive the hydraulic pump on one of its power swivels with a Caterpillar model D-311 diesel, rated 57 hp. at 2000 rpm. The diesel was furnished by Mustang Tractor & Equipment Company, Inc., of Houston.

ROBERT H. RAY COMPANY, Houston, has bought a Stewart & Stevenson model 2GD21C ac generator set, powered by a General Motors series 71, model 2-2030C diesel. The unit is sheet metal enclosed, and mounted on a 2-wheel, rubber-tired trailer. It is the second such unit the company has bought, and is destined for export to Libya.

PENROD DRILLING Company, drilling contractor of Shreveport, Louisiana, has bought from Waukesha Sales & Service, Inc., Houston, a model 135DKU Waukesha diesel. The engine, rated 106 hp. at 1800 rpm., will be installed as auxiliary power.

NICKLOS DRILLING Company, Houston, has bought three Stewart & Stevenson model 110GD100 ac generating sets, each powered by a General Motors series 110, model 62403 6-cylinder diesel. Each unit is equipped with complete automatic control and distribution panel. They will be installed on an offshore drilling platform. The company also purchased a Westinghouse 5Yc air compressor, driven by a 2-cylinder model AVA2 air-cooled Petter diesel, which will furnish starting air.

Washington State Representative

The Frank K. Donnelly Company, of Seattle, has been appointed sales representative in the state of Washington by J. F. Pritchard and Company of California, Kansas City, Missouri. Pritchard designs and manufactures cooling towers for air conditioning and industrial applications and Hydryers, packaged dehydration units for air and other gases.

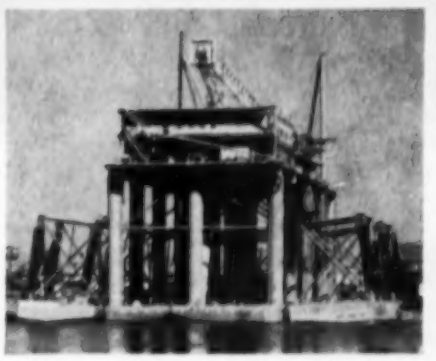
Mr. Donnelly has been a manufacturer's representative since 1954 and now specializes in heating, air conditioning and industrial equipment for the growing Pacific Northwest.

Purchases 50 Tractors

As part of a $2,250,000 fleet improvement program, Mid-States Freight Lines, Inc., Chicago, Illinois, has purchased 50 turbodiesel tractors. "These new units," according to John W. Ferguson, vice-president in charge of Transportation for Mid-States, "will be operated on the company's relay system which extends from New York City, Philadelphia, and New England on the east, to Chicago and Middle West. We expect the new turbodiesels to log approximately 120,000 miles a year." Mid-States currently has operating rights over approximately 10,000 miles of certified routes.

White Motors Company 900 TD tractors with 175 hp Model JT-6-B Cummins turbodiesels were specified by Mid-States. Mr. Ferguson reports: "In making this purchase we were looking for a unit that would give us the greatest weight advantage at the lowest cost per mile. We also wanted a vehicle that could provide a safety factor in that the truck would have power to move with the flow of modern traffic instead of being a highway hazard. To date, Cummins powered Whites are living up to all expectations."

So you were sure the bedplate was strong enough to hold everything in line until the armature bindings got out by chafing on the fields. Now, we check alignment occasionally.



Marquette GOVERNORS
regulate diesel engines on submersible drilling barge

American Tidelands Barge "101" is designed to drill for oil and gas beneath the waters of the Gulf of Mexico.

After being towed to location, the barge is flooded with sea water and settles to the floor of the ocean, held in place by its own weight and by the stabilizing pontoons at each side. The two-story superstructure, supported on 52 ft. columns, houses the machinery, drilling equipment and crew.

The rig's main power comes from a battery of five GM Cleveland Diesels, regulated by Marquette Hydraulic Governors.

Massey GOVERNORS

Marquette GOVERNORS

Engineering facilities and service agencies for Massey and Marquette Governors are at your disposal for all problems of governing and control.

MARQUETTE METAL PRODUCTS DIVISION
CURTISS-WRIGHT
CORPORATION • CLEVELAND 10, OHIO

Other Marquette Products: ROLLER BEARING TEXTILE SPINDLES • WINDSHIELD WIPERS FOR AIRCRAFT • SPRING CLUTCHES • ROTARY OIL PUMPS • PRECISION PARTS AND ASSEMBLIES

Beauty Afloat

Driven by a pair of 300 hp General Motors diesels this graceful 61-footer does 16 mph with ease.

A suggestion of the clipper ship's bow, and a touch of the modern steamline gives this Wheeler's Boat No. 1 a handsome appearance as its twin diesels push it along at an easy 16 mph. With extraordinary sea going ability, economy in operation combined with speed and comfort and the sturdy construction for which the builders are noted, this fine yacht is worthy of more than passing notice.

A pair of GM Detroit model 6-110 diesels are installed in the usual location under the lounge. Controls are located on the bridge wtih access hatches closed and carpet down, the presence of machinery is hardly detectable. There is also a Kohler diesel generating plant rated at 10 kw, ac not only to furnish light but to heat the boat electrically and provide power to operate the electric range in the galley as well as the various appliances including refrigerator for a liberal food supply.

It is worthy of note at this point that the generator must run continuously to furnish heat and cooking facilities as the floating battery cannot carry such high loads more than momentarily. Except on the very largest ocean-going yachts of the past continuous operation of a generator was not tolerated because of noise and vibration in the midst of living quarters. This installation symbolizes the advances made in diesel design and manufacture and the achievements in silencing engines as well as soundproofing machinery spaces.

The Monel metal tank capacities for long cruises are 500 gallons of fuel and 300 gallons of fresh water. Navigational aids include radar, sonar, half-mile-ray search light, Kelvin White compass and radio telephone. Other items of importance are Groco toilets and water system, Surrette batteries, Goodrich shaft-bearings, Gems electric "bilge watchman" and Ideal anchor windlass.

European Diesel News

By Bernard W. Landsdowne

BURMEISTER & Wain of Copenhagen have cooperated with the Societie des Forges et Ateliers du Creusot (Schneider & Cie) in the development, by the French company, of a new design, high-speed, high-output, two-stroke diesel engine. The engine is now available with six to 18 cylinders in Vee form, the cylinder dimensions being 220 mm. by 340 mm. An output of 110 bhp per cylinder at 800 rpm is obtained from the design with normal scavenging, this figure being increased to 130 bhp per cylinder in the turbocharged version. With charge-air cooling down to 120 deg. F., the rating is 138 bhp per cylinder, while with cooling down to 57.5 deg. F., the rating is 145 bhp per cylinder. The specific weight is given as 14½ to 20 lb. per bhp, according to the pressure-charging arrangements used.

Some interesting production and order-book figures have been announced by Burmeister & Wain who state that on December 1, 1955, they and their licensees had delivered or had on order no less than 323 turbocharged, single-acting, two-stroke diesel engines with a combined output of approximately 2¼ million bhp. There were then 61 ships in service with this type of engine.

TWELVE high-speed, twin-screw launches are being built by a French shipyard at Cannes for the Venezuelan police force. They will be powered by Mercedes-Benz MB820Bb engines with a cylinder bore of 175 mm., and a stroke of 205 mm., providing 1,000 bhp at 1,500 rpm. ZF type electromagnetic transmission gear units manufactured by Zahnradfabrik, Friedrichshafen will be used.

TWO BIG main diesel engines for the Swedish American Line's new passenger ship M.S. *Gripsholm* are now almost ready for delivery from Gotaverken to the Ansaldo Shipyard in Genoa, where the ship is being built.

THE Chrysler Corporation, at the recent Brussels Motor Show were offering their Plymouth Belvedere car fitted with a Perkins four-cylinder diesel engine as an alternative to the conventional petrol-power unit. This is the first time an American manufacturer has standardized a British diesel engine and it was stated that it would be offered as first equipment in the Chrysler car and that engineless chassis would be shipped from America to Antwerp, where the diesel units would be installed.

WIDESPREAD publicity is now being given in Great Britain to a new type of diesel engine lubricant marketed by the Shell Petroleum Co., Ltd. It is claimed to be the first of its kind in the world and to be extremely effective in reducing cylinder wear in large marine engines burning heavy fuel.

F. PERKINS, Ltd., of Peterborough have secured a contract valued at more than a million dollars to supply diesel engines for a Canadian tractor. The order has been placed by Cockshutt Farm Equipment Ltd., Ontario, this being the first time that a Canadian tractor firm has standardized a British engine.

AN AGREEMENT has been announced between the Brush Group Ltd., and Maybach Motorenbau, G.m.b.H. of Friedrichshafen, Germany, whereby the latter have agreed to grant exclusive manufacturing rights in the United Kingdom for the Maybach high-speed MD range of lightweight diesel engines. The Maybach MD range includes four-, six-, eight-, twelve-, and 16-cylinder designs, both normally-aspirated and turbo pressure-charged.

A FURTHER order for 100 A.E.C. engines to be supplied to the Canadian Car and Foundry Co., Ltd., of Montreal, has been announced by A.C.V. Sales, Ltd. Can-car, who built the majority of buses for the Canadian market, have already used some 747 A.E.C. engines of various types, this latest order being for the A.E.C. 11.3 litre horizontal unit of 150 b.h.p. output.

LEYLAND diesel engines are to be manufactured in Holland b ythe Dutch company of Van Doorne's Automobielfabriek, N.V., builders of D.A.F. vehicles and trailers. Under a new agreement signed by Leyland Motors and the Dutch company, the latter will have the right to manufacture Leyland diesel engines of various sizes in horizontal and vertical forms, together with the Albion four-cylinder horizontal and vertical 60 bhp unit. A new factory is being built in Holland to produce these engines.

A NEW Fiat crawler tractor known as the Fiat 55 LI is now available. It is an improvement on the older 55L. type embodying many new features resulting from world-wide experience with the earlier design.

DURING the Liege Trade Fair in Belgium last year, a bogie-mounted rail traction diesel power unit attracted much attention. It is the latest product of S.E.M.-Carels of Ghent, and is being supplied to the Societe Nationale des Chemins de Fer Belges. The complete unit includes an S.E.M.-Carels 6K-103-H horizontal diesel engine, an S.E.M.-GTC4 hydraulic transmission, air compressor for the brakes and auxiliaries, the battery-charging dynamo and the exhaust silencer. The Carels diesel engine provides a continuous power output of 320 bhp at 1,350 rpm with a one hour rating of 350 bhp.

New Line of Tractors

The White '9000' Line, the new highway tractor design unveiled at the trucking industry's show, the ATA convention in Washington late last year, is now in production, it was announced by J. N. Bauman, executive vice-president of The White Motor Company. In introducing the new models, Mr. Bauman said, "With the addition of this 9000 Line of these tractors, White has the only complete coverage of the highway tractor market in the industry, under all three types of today's state highway legislation.

"The road law pattern now seems to have settled down into three types of laws," he said, "and each of these patterns requires a basically different kind of highway tractor to achieve maximum payload and operating efficiency."

These three state patterns include: (1) The states that have maximum allowable gross vehicle weight determined by the "L" dimension (front tractor axle to rear tractor axle. (2) The states where maximum gross weight is not determined by an "L" dimension and has strict axle load limitation. (3) The states that have a limited gross weight allowance but liberal axle load limitations in proportion to total GWV.

New Filter Package

The Champ Microtype pleated paper oil filter is now being distributed by the Champion Laboratories of Meriden, Conn., in a colorful new enclosure. These resin-treated pleated paper elements, according to the manufacturer, give micronic filtration which traps particles as small as one micron (.00039 of an inch), will not collapse, disintegrate, channel or unload. They provide a non-warping filter which gives a maximum of filtering surface far greater than other media. The new, modern "look," a proven sales-aid for many products, will be available in the entire Microtype line very shortly, according to Champion Laboratories.

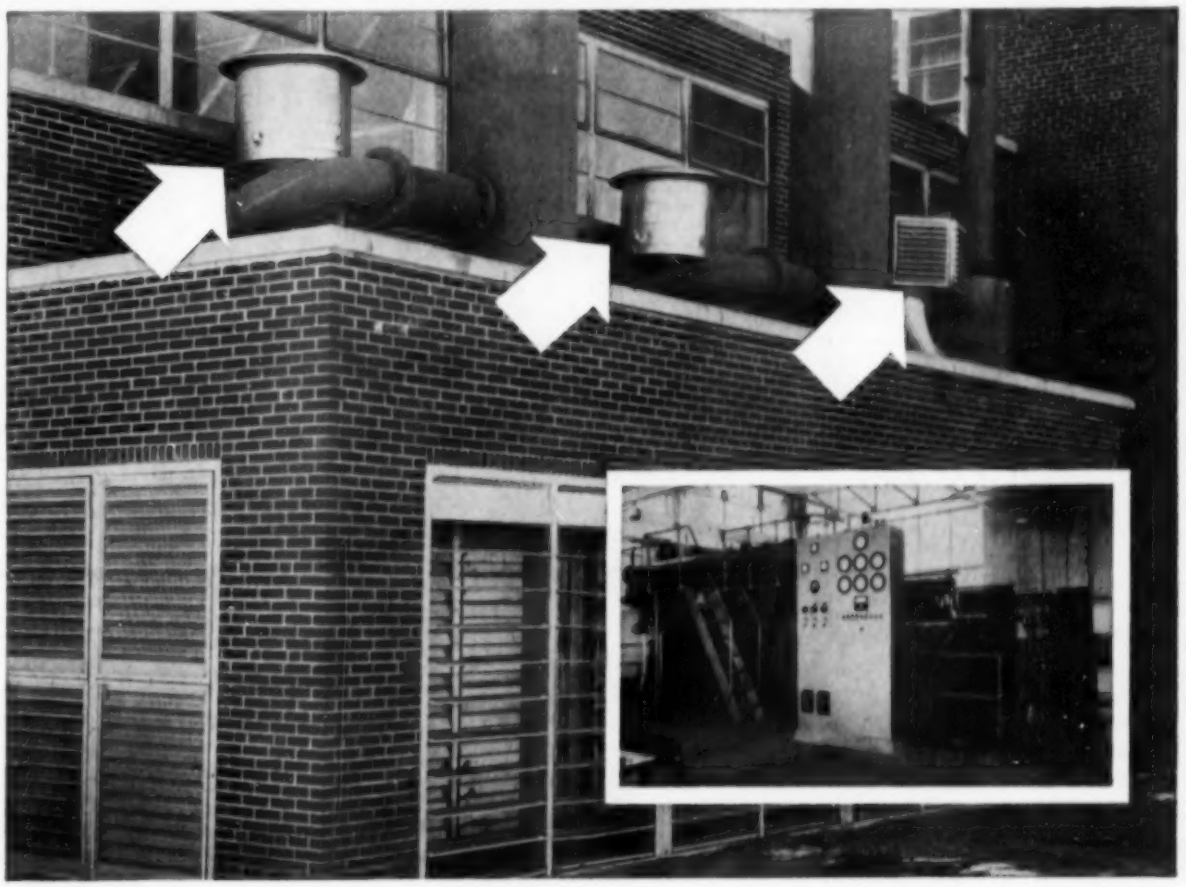
Purchases F-M Engine

City of Thayer, Missouri awarded $160,000 contract, on competitive bidding, to Fairbanks, Morse & Company for a 1600 hp diesel engine to be installed in the Municipal Electric Plant. Building is to be extended. Work on building and engine foundations is now under way. Consulting Engineers are B. L. Oliver & Company, Grand Avenue Bank Bldg., Kansas City, Missouri.

Fuel Injector Line

A controlled and more uniform fuel injection suitable for any diesel engine is claimed for the Parker fuel injector. For each cylinder of the engine, there is a pressure-control valve and a fuel-pressurizing plunger. The plunger is cut with two helixes. At the charging stroke, a port admits the maximum amount of fuel under constant low pressure to the plunger chamber. The fuel is then forced at high pressure to open a pressure-control valve into a common pressure-balancing fuel receiver. Near the top of the plunger-stroke the fuel, still under high pressure, reverses its direction of travel when the first helix provides a passage for measuring and delivering the fuel to the spray valve. The second helix spills the surplus diesel fuel into the suction chamber.

An eccentric camshaft is used. It lowers stresses. It controls each injection of fuel. The injector is simple in operation. It is easy to mount on the crankcase panel of engines from 20 to 100 hp per cylinder. Each unit, built of uniform parts, covers a wide range of bore, stroke and rpm. Individual pump units for each cylinder are also available. Parker Diesel Engineering Company, 945 19th Avenue, Oakland 6, Calif. ITS NEW



Air-Maze filters on Cooper-Bessemer engines help Wolverine Cooperative win "most efficient" award

ENGINES, transformers, plant design—all contributed to the overall plant efficiency of Wolverine Electric Cooperative, this year's winner of "THE MOST EFFICIENT REA PLANT" award. Another big contribution was made by the two Air-Maze oil-bath filters and one DH panel assembly on the intakes of three Cooper-Bessemer dual fuel engines.

Air-Maze oil-bath filters scrub intake air in a pool of oil. An oil-washed screen filter traps any remaining dust, passing only clean, oil-free air. Air-Maze type DH ("dog house") panel assemblies clean intake air by trapping dirt in flat panel type filters. Abrasive dust and dirt can't get through to damage polished engine parts. Engines run smoother, wear is reduced, efficiency increased.

Thousands of America's diesels rely on Air-Maze filters for clean air, clean fuel oil, clean lube oil. They're specified by leading diesel engine manufacturers throughout the country. For full information on the hundreds of filter types and sizes engineered by Air-Maze, write the Air-Maze Corporation, Cleveland 28, Ohio.

AFI MEMBER

The biggest names in diesels are protected by Air-Maze filters

AIR FILTERS
SILENCERS
SPARK ARRESTERS

AIR-MAZE
The Filter Engineers

LIQUID FILTERS
OIL SEPARATORS
GREASE FILTERS

Improves Payscraper Line

The improved International Model 75 Payscraper now in production has a heaped capacity of 20 cu. yd. Over seven major engineering improvements have been incorporated in the new unit.

DESIGN changes brought about by close customer-engineering cooperation in the field on jobs is reflected in the new improved 1956 International Harvester Company self-propelled, rubber-tired Payscraper line. The two new Payscraper models now in production, with deliveries scheduled early in March, are the 262-hp "75" and the 172-hp "55." The model 75 capacity has been increased to 20 cu. yd. heaped and the model 55 to 14 cu. yd. heaped. Other changes now engineered in the new units are: (1) straight-back bowl; (2) lower draft frame; (3) greater visibility; (4) new cerametallic clutch facing (on the "75"); (5) higher apron lift; (6) bigger push block; and (7) improved ejector.

The back of the Payscraper bowl has been redesigned similar to a dozer blade. The dirt boils back into the bowl from the cutting edge, fills the corners, and heaps a full load in seconds. A new cermetallic clutch is made of a combination of powdered metals and ceramic materials similar to those used in jet airplane brakes. The new clutch provides more positive clutch engagement and reduces slippage. Adjustment is less frequent, and clutch life has been lengthened considerably.

The apron lift is now higher than in the previous models and a wider and bigger push block permits the operator of the push tractor to make positive contact with minimum effort. Visibility has been improved in the 1956 Payscraper line. The lower draft frame gives the operator improved vision of both the bowl and the push tractor. Heavy-duty, two-shoe air brakes are synchronized on both tractor and scraper wheels. In addition, an auxiliary hand brake provides individual braking of the drive wheels for "walking" out of rough going. Multiple-disc cable control assures fast, efficient scraper action. Wrap-around brake bands with large friction areas assure positive hold. Effortless hydraulic power steering is provided by exclusive International Hydro-Steer.

The "75" and "55" Payscrapers have been completely field tested, and International is confident the improved models will find ready acceptance in the field by contractors who are on the alert for machines capable of moving dirt more economically and faster.

Automotive Diesel Progress

. . . continued from page 64 . . .

Admittedly, gasoline injection offers alluring possibilities, notwithstanding. It certainly promises more uniform distribution of fuel as between the cylinders than the carburetor. Granting that the engine designer can contrive proper manifolding and porting to match this with air distribution, better overall uniformity of mixture, cylinder to cylinder should result.

The greater this uniformity, the less need there will be for excess overall richness to compensate for starved cylinders. This may mean as much as 10 per cent gain in power output. Closer control of mixture ratio, furthermore, can certainly contribute to better torque at low speeds, where air velocity is low, without sacrifice of peak power.

This and other resultant improvements may be expected to favor fuel economy, estimated by some enthusiasts at as much as 15 per cent. This is hardly enough to cause misgivings to the diesel brotherhood. Much of the gain in power will come from improved volumetric efficiency, obtained through the larger intake manifold passages made possible by the fact that air speed, obtained through restriction, is not depended upon to suck the fuel from the nozzles. Also the fact that there is no fuel in the manifold to condense or centrifuge out permits lower air velocity through larger engine passages.

An additional contribution of importance is the elimination of the necessity for heating the manifold, so that air density will be greater. The dry manifold will permit leaner starting and accelerating. Vapor lock may cease to be a problem. A cooler intake will decrease detonation tendency, thus permitting an earlier spark, higher compression or lower octane fuel—but not all three at once. These systems can endow the gasoline engine with an advantage long enjoyed by some automotive diesels, namely complete shut-off of fuel feed during deceleration or coasting, thus providing increased engine retardation or braking, elimination of back-firing, smell and smoke at such times and a slight decrease in fuel consumption.

Gasoline injection systems must be divided into two main classes: Direct and manifold injection types. A third class, often erroneously grouped with gasoline injection systems is the "Injection" or pressure carburetor. The direct injection system injects the fuel directly into the combustion chamber. The manifold type injects it into the individual ports, just below the valves. While the direct injection system resembles that used on diesels at first glance, it is quite different in that injection is prolonged and not too sensitive to timing and at much lower pressure. The manifold type offers the considerable advantage over the direct type that it may be made much simpler and at lower cost. It is not as well suited to high speeds and will not give the snap and response of the direct type.

Much ingenuity has been exhibited by the designers of gasoline injection systems and, as may be expected, the devices employed are in great variety. Some employ the multiple-unit jerk pump, either of the multi-plunger or single-plunger type, with hydraulic nozzles. Others have a single primary pump with a distributor and individual injection pumps. Still others are of the common-rail form with solenoid-operated nozzle valves. Some provide timed injection and others do not. Pressures employed, of course, are considerably below those required by diesel injection systems; but the fuel, gasoline, is decidedly deficient in lubricating quality.

Metering control of necessity must be tied in with the throttle, usually indirectly and such control systems are as varied in principle and design as the basic injection equipment itself. Of necessity they are much more complicated than those used by diesel injection systems because of the necessity of maintaining more constant mixture ratios and allowing for the inevitable lag in air delivery by reason of throttling. There must be compensation for engine speed, for air velocity, air volume and air density. There must be provision for mixture enrichment for starting and acceleration and against loading when the throttle is suddenly closed. Finally, engine temperature must be taken into account.

From the fuel standpoint, gasoline injection promises real improvement since engines so equipped will assuredly be less critical of end-point or volatility and vapor pressure. For the same compensation pressure and spark advance, a slight reduction of octane requirement will result. These advantages will not redound to the benefit of the petroleum industry until gasoline injection comes into real volume usage, at which time it will probably be necessary to market a special grade of gasoline for injection-equipped vehicles.

No one seems to believe that gasoline injection equipment can be provided now or in the foreseeable future at a cost anywhere near the really low cost of conventional carburetors.

Merger of Honan-Crane and Michiana

Commercial Filters Corporation of Melrose, Massachusetts has announced the merger of two famous filter lines — Honan-Crane and Michiana—to form a new subsidiary, Indiana Commercial Filters Corporation. This action follows the Massachusetts firm's recent purchase of Houdaille-Hershey of Indiana, Inc. (makers of Honan-Crane filters) and the Filter Division of Michiana Products Corporation.

Honan-Crane and Michiana manufacturing, research and engineering facilities will be consolidated at Lebanon, Indiana. The Honan-Crane and Michiana filter lines will be retained under their present names, while a new brand name —"CFC"—will identify filtering and conveying equipment formerly known as "Houdaille." With the acquisition of Honan-Crane and Michiana assets, Commercial Filters Corporation becomes one of the largest industrial filter operations in the country. The parent company will continue to manufacture Commercial Fulflo Filters and Honeycomb Filter Tubes at its modern Melrose plant. The newly-formed Indiana Commercial Filters will produce a complete line of Michiana, Honan-Crane and CFC Filters for metal-working, diesel (including stationary, railroad and marine types), power generating, hydraulic and turbine equipment.

An integrated sales organization has been established to market the products of both companies. This step gives customers a single source of supply for an extremely wide range of filter types plus the benefits of coordinated research and engineering effort between the parent company and its subsidiary.

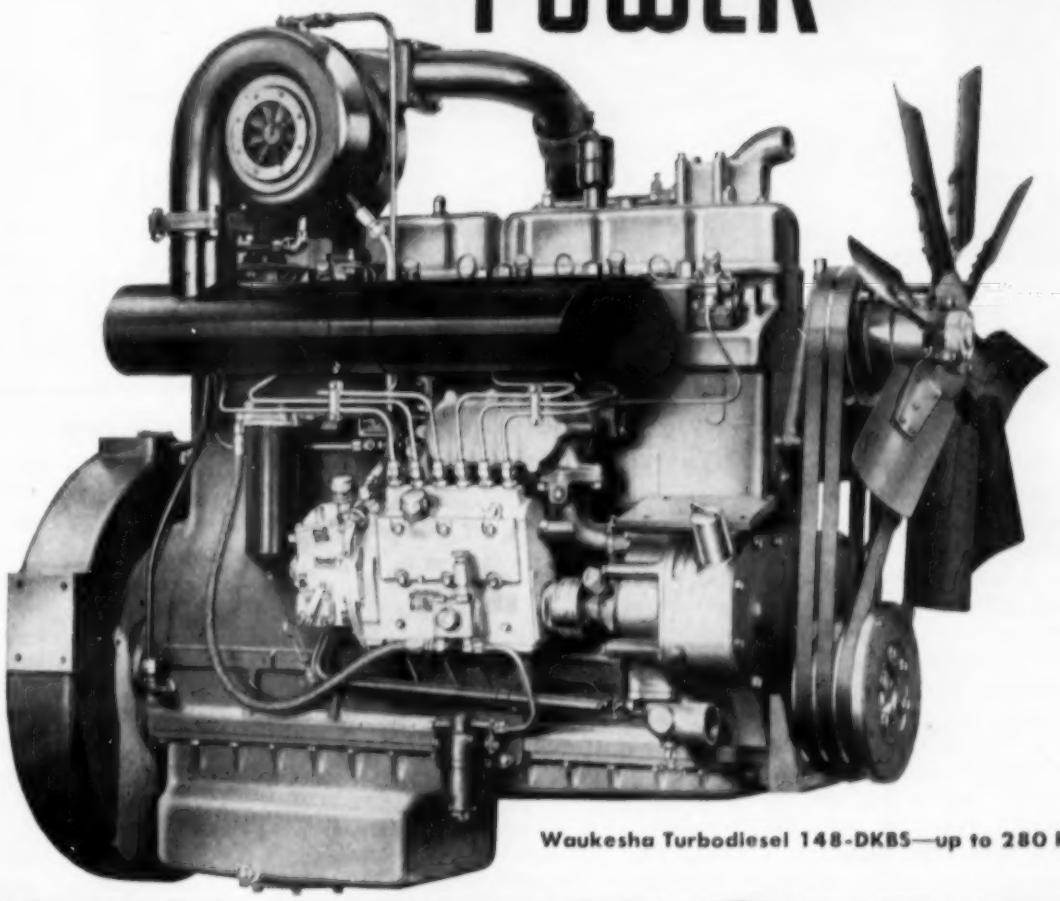
To head the sales organization, R. L. Fielding, president of Commercial Filters, has announced the election of Charles I. Wallace as vice president in charge of sales. Mr. Wallace is also vice president and general manager of Indiana Commercial Filters Corporation with headquarters at the Lebanon (Ind.) plant. Other key appointments include: J. R. Chisholm, from assistant sales manager to sales manager, Commercial Filters, Melrose, Mass. Walter J. Holder, formerly Chicago district manager, to sales manager, Indiana Commercial Filters, Lebanon, Ind. R. N. Burckhalter, to sales manager for Michiana Filters with offices in Chicago. District sales offices will be maintained as follows: New York (Eastern District)—W. S. James, manager; R. P. Nichols, assistant to district manager; J. L. Montmarquet, export manager. Memphis (Southern District)—C. F. Holland, manager. Chicago (Central District)—Philip R. Matravers, manager; George B. Furey, assistant to manager. Los Angeles (Western District—J. D. Weatherford, manager.

Air Suspension Height Control Valve Tool Set

Disassembly, reassembly, and adjustment of the three height control valves used in the air suspension models of GMC coaches can now be properly handled. The Kent-Moore Organization, Inc. has just released the tool set which is essential for the precision adjustments required during valve reconditioning. Tool Set No. J 6049 as described in GMC Coach Service Bulletin C-15-005.

The height control valves, because of the function they perform in metering air into or out of the air suspension units, must be precision built and accurately calibrated. Personnel responsible for valve overhaul should recognize the need for careful handling and accurate calibration. Further information may be obtained by writing the Kent-Moore Organization, Inc. 5-105 General Motors Bldg., Detroit 2, Michigan. (ITS NEW)

MORE POWER TO YOU!



Waukesha Turbodiesel 148-DKBS—up to 280 hp

WAUKESHA Diesels

Compact, and power-packed—Waukesha 148-DKBS is a 6-cyl., 779 cu. in. Supercharged Diesel that has lively acceleration, clean burning, prompt starting, a tremendous reserve of power, and great overall economy. Waukesha's exhaust turbocharger system greatly increases horsepower—from 200 hp (of the normally aspirated 148-DKB) up to 280 hp at 2100 rpm in this Turbodiesel model. Send for Bulletin 1647.

WAUKESHA MOTOR COMPANY
Waukesha Wisconsin
New York • Tulsa • Los Angeles

50th ANNIVERSARY Waukesha Motor Co. 1906-1956

300

Landing Craft Retriever

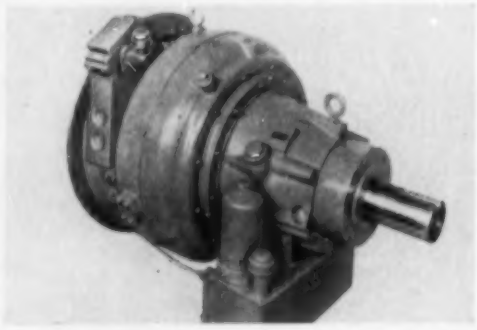
A sprawling mass of olive-drab beams, wading about the ocean surf on gigantic rubber tires, promises to save the Army Transportation Corps millions of dollars through mechanized recovery of stranded landing craft. The machine was designed and built by R. G. LeTourneau, Inc., of Longview, Texas. Actually the machine is a highly intricate arrangement of hoists, wheels, and engineered power which enables it to straddle a 67-ton vessel and literally lift it from the water. It was constructed in answer to a request by the Army for a new concept of retrieving equipment, needed to handle the large percentage of craft which become impaired during landing operations.

The Landing Craft Retriever, electrically self-propelled and traveling on four of the largest rubber tires in the world, was LeTourneau's answer. The secret behind the retriever's workability is a separate electric motor and gear reduction built into each individual wheel. Because these are contained within the centers of the wheels themselves, and frequently must operate under water, each is totally waterproofed and furnished air under pressure for cooling. A system of simple electric switches makes it possible for one man to operate all functions of the 101-ton unit, although a crew is maintained for attaching hoist cables to the grounded or capsized small craft.

The self-propelled retriever is capable of recovering stranded or capsized vessels in water up to eight feet in depth and can lift any craft up to and including the large LCM-8 (67 tons). In size the LeTourneau retriever is 75 feet long, 38 feet wide, and 22 feet high. Even fully loaded, it can climb a 20 per cent grade. Power for all motors is supplied by two General Motors (6-71) diesel engines driving LeTourneau-built generators. Each wheel is equipped with tubeless tires 10 feet high and four feet wide, allowing flotation and traction in extremely soft terrain.

New Torque Converter Offered

The Twin Disc Clutch Company, Racine, Wisconsin, has just announced the new Three-Stage 13,800 Series torque converter. Now, Twin Disc provides a torque converter for every horsepower range from 40 to 1,000—offering four distinct sizes, with a total of twenty-nine capacities, through internal blading variations. The new 13,800 Series was designed specifically to accommodate a large number of engines for which previous models were not ideally suited—particularly in the oil fields and in industrial locomotives (note following list of engine manufacturers and specific models): Allis-Chalmers: PC1879, DC1879, DSC-1879, PCS-1879, PC-2505, Caterpillar: D-342, D8, D-364, D9, D-375, D-386; Climax: R-81, V-285, V-330, V-85; Cummins: LRI, NVHS, VT-12; Deetz: BA8M517; Fairbanks: 38F5-¼; Gardner: 6-13; Hall Scott: V-12; LeRoi: H-1500, H-200; M.A.N.: 5WV-175/122-A; Mercedes-Benz: MB836-B, MG836-BG; MGO: V8S, V12; Murphy: 24, 122, 322; Paxman: V6RPHXL; Sauer: Sterling: V-D6; Waukesha: NKD, NKR, NKDS, LRD.



One of the outstanding features of this new series is its simplicity of design. It is planned around a simple basic unit, with easy-to-add components which produce ten specific models. The 13,800 Series provides two output arrangements. There is one standard output shaft assembly designed for maximum side pull loads up to the full capacity of the converter. On this particular type output shaft assembly, an output governor take-off is available. There is also one standard output flange designed for universal joint or flexible gear coupling drive. There are three input arrangements provided on the 13,800 Series.

The new Twin Disc 13,800 Series is designed to fit new SAE standard flywheels recently developed, and accommodates both Nos. 0 and 00 housing sizes. In addition to being offered in ten different models, this new torque converter can be adapted, with appropriate engine speeds, to all engines in the 60 to 600 horsepower range by internal blading variations—by either changing the blade angle or by varying the number of blades.

All Twin Disc Torque Converters offer a variety of power input, output combinations to match any engine hook-up. This is typical of the thoroughness and versatility that has made Twin Disc the world's largest manufacturer of friction and fluid drives for powered industrial equipment. For more information, contact Twin Disc Clutch Company, Hydraulic Division, Rockford, Illinois. (ITS NEW)

Public Relations Staff Member

D. Gregg Cummings

Appointment of D. Gregg Cummings to the public relations staff of Electro-Motive Division of General Motors is announced by Volney B. Fowler, director of public relations. Mr. Cummings, who has been merchandising specialist in the sales promotion section of the sales department, is in charge of exhibits and general information in his new capacity. Born in Chicago, January 24, 1916, he attended Chicago Latin School and was graduated from Choate School, Wallingford, Conn. He attended the University of Virginia and after working in electrical and advertising fields, joined Electro-Motive Division in 1941 as a member of the parts department.

Mr. Cummings was on military leave of absence from 1942 to 1946, serving with the U. S. Army Air Corps. Upon discharge from the service, Mr. Cummings returned to Electro-Motive as parts representative in the La Grange office. He transferred to sales promotion in 1954 as merchandising specialist, the position he held prior to his present appointment.

General Manager

E. J. Mercer

E. J. Mercer has been appointed general manager, Construction Machinery Division, Allis-Chalmers Mfg. Co., Milwaukee, according to B. S. Oberlink, vice president in charge of the Tractor Group. Mr. Mercer has been managing director of Allis-Chalmers Great Britain Limited with headquarters at Essendine, England. In that position he directed all operations for world sales of English A-C products.

Tuthill Sales Manager

A. L. Caney

A. L. Caney has been made general sales manager of Tuthill Pump Company, Chicago, according to James G. Tuthill, vice-president. Before joining Tuthill, Mr. Caney was district representative in the middle west for Diamond Chain Company and earlier was assistant manager of engineering sales for the Crane Company prior to service with the air force during the Korean war.

Elected President of AED

Stanley F. Laskey

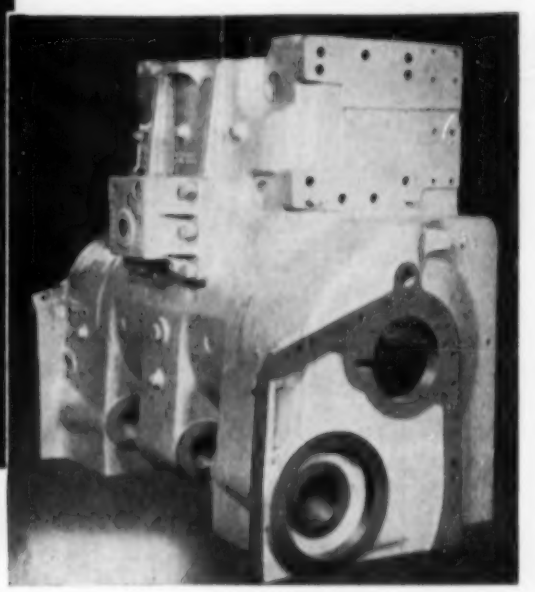
Stanley F. Laskey, president of Northwestern Equipment, Inc, in Fargo, N.D., was elected president of Associated Equipment Distributors, the national trade association of construction equipment dealers, at the group's 37th Annual Meeting in the Conrad Hilton Hotel in Chicago. Some 3,000 construction equipment distributors and manufacturers from the United States and Canada attended the meeting. The five-day program was designed to further manufacturer-distributor relationships, work out mutual problems and prepare for what promises to be one of the biggest sales years in the history of the industry.

Twenty Years of Service

D. H. Briggs (left), assistant service manager of GM's Detroit Diesel Engine Division, has just completed 20 years' association with the GM Detroit Diesel engine. He is shown here receiving an award in recognition of the occasion from Detroit Diesel's general sales manager, R. E. Hunter. Mr. Briggs joined General Motors in 1936 and engaged in experimental work on the engine for two years before production by the Detroit Division.

For a time it looked as if high speed would chase out the slow-speed, direct connected marine diesel but the Europeans are installing them again in good motorships. The American answer to this is to build no ships, much less motorships.

BEFORE



and AFTER

This apparently hopelessly broken D8 transmission case left our shop after a few days in "as-new" condition and ready for another lifetime of work.

A valuable and important piece of equipment, as a consequence, was quickly placed back into service at a fraction of the part's replacement cost. Another example of GUTH-PASCOE restoration work.

All ferrous and many non-ferrous castings (aluminum included) can be restored at substantial savings by the GUTH FUSION PROCESS no matter how badly damaged. Size and complexity is no obstacle. Castings are returned to original specifications. It will pay you to investigate GUTH-PASCOE. On your next job, give GUTH-PASCOE the break!

GUTH-PASCOE COMPANY

1933 East Washington Street • Phoenix, Ariz. • Phone ALpine 4-0391

EMERGENCY rush service day or night . . . Sundays and Holidays included

BRIGGS EQUIPPED WOLVERINE ELECTRIC, JOHNSON PLANT, WINS DIESEL PROGRESS AWARD FOR TOP EFFICIENCY FOR THIRD TIME!

BRIGGS IS GLAD "TO BE ABOARD"

Wolverine does it again . . . for third year . . . all of the facts are in this issue.

If you want award-winning efficiency from your oil filters, why not get some facts about Briggs?

Three modest little reports on how to achieve award-winning performance tell you how Diesel owners are getting better performance.

FREE BOOKLETS

Write for three briefly written reports on oil filtration. They are brimful of fundamentals that you'll want to read about.

Briggs PIONEERS IN MODERN OIL FILTRATION

The Cooper-Bessemers shown are Briggs equipped and are one of the important award-winning factors at Wolverine.

OIL FILTERS

THE BRIGGS FILTRATION CO.
WASHINGTON 16, D.C. DEPT. 93

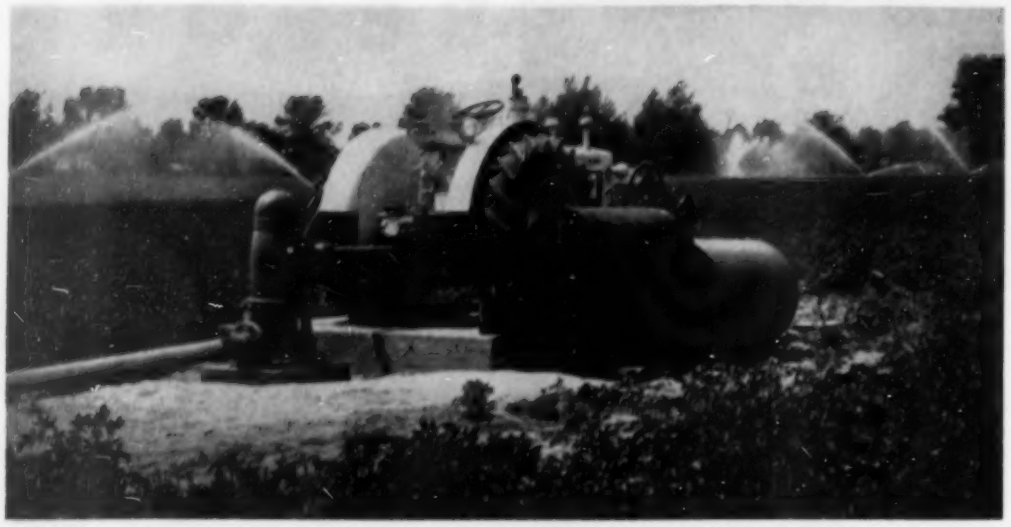
YES! Send me your reports on oil filtration.

Name .....

Company .....

Address .....

Double Duty Unit



A diesel farm tractor put to work last Spring on a 90-acre potato farm has made Verne Robinson of Coral, Michigan a real booster for diesel. Mr. Robinson, who had been plowing approximately ten acres per day, put an Oliver Super 99 powered by a GM 3-71 Detroit Diesel engine on the job and stepped up his plowing to 30 acres per day.

At the time Mr. Robinson bought his new tractor he was also in the market for an engine to operate an irrigation pump. The purchase of this engine proved unnecessary, however, when he found that the diesel with rear power take-off in the Oliver could double round the clock as a pumping engine. During the growing season the tractor, backed up to the pump, put water through his irrigation system at the rate of 800 gallons per minute.

The tractor pulling a five-bottom plow and clod buster prepares the soil for planting in one operation. In addition to reducing his Spring plowing time, Mr. Robinson also substantially reduced his plowing and pumping fuel costs and saved the price of a separate irrigation engine as well.

Wheeled Fortress

WITH cash money in unprecedented demand today, Brinks, Inc. has placed this dieselized, six-wheel, armored International model RDF-192 in Federal Reserve Bank service, hauling coins and currency between district and member banks. The truck is shown as it starts a journey eastward from Chicago Federal Reserve Bank. Powered by a Cummins JT-6-B turbocharger diesel engine, it has a five-speed main transmission with three-speed auxiliary. All-over armor and bullet-resisting glass protect crew and cargo. Crew is equipped with a variety of defensive weapons. In its over-all operation, Brink's handles about one billion dollars in cash daily. No Brink's armored car has been successfully attacked in 30 years.

Eastern Diesel Observations

. . . continued from page 60 . . .

diesel boats play a very important role. Perhaps we can learn from them. A recent order placed with European yards included 20 diesel trawlers 190 ft. in length which is far in excess of the size of American tuna clippers, New England beam trawlers, or for that matter any of the British Grimsby type vessels. This order and several others like it are not particularly significant until we take into account the contracts placed for a number of factory ships, diesel driven, to be based at Vladivostock. They are 565 ft. long of 3,240 tons dwc having M.A.N. diesel propulsion of 3,120 bhp giving a speed of 15½ knots.

These mother ships serve as tankers and supply vessels for the trawlers. They process and refrigerate the fish delivered to them by the fishing vessels. Fish waste is converted into oil and fish meal. They utilize everything but the smell. Of major importance is the fact that the trawlers need not return to base except for periodic dry docking and overhaul. Therefore, crews and vessels work continuously which contrasts sharply to American practice of crews spending much of their time as "tourists" traveling to and returning from the fishing grounds. Apparently the Russian system contemplates the possibility of proceeding to distant points such as the Indian Ocean or perhaps as far away as the coast of South America. They would work continuously while the processed catches were moved in bulk to the markets at home or abroad. Whatever the details of operation may be, it is apparent that the Soviets plan to utilize marine diesels to better the efficiency of the fishing operation from the point of catch to the market place.

In the face of very efficient operation it would be difficult for any other country to invade the Soviet market even if all barriers to trade were removed. The encouragement of similar procedure in this country is in order.

BAHAMAN $30,000,000 SHIPYARD

The impact of a tax-free economy upon competitive shipbuilding can be a matter of grave concern to all classes of shipbuilding in the United States, including the many yards building dieselized boats. Bahaman legislation has created a freeport area on Grand Bahama Island wherein there will be neither corporate nor individual taxation for the next 30 years at least. For 99 years firms will not be subject to import excise stamps nor export taxes. This makes it extremely easy to bring in items such as diesel engines and steel from the United States, or from other countries in a position to compete.

Taking advantage of this situation, the D. K. Ludwig interests plan to build a huge shipyard capable of handling the largest ships afloat. It will be a new construction, repair and scrapping yard to be known as Bahama Shipyards, Ltd. The Ludwig interest includes National Bulk Carriers, Inc., American Tanker Corp. of Delaware, Seatanks, Inc. and Universe Tankships, Inc.

While raw materials are not near at hand, the tax-free economy, low wages paid to islanders and the low cost of freight movement by sea will make ship building so low in cost as to preclude the possibility of competition. In the interest of tug and towboat construction, it is quite evident that adequate protective tariffs must be maintained. At the outset there is no doubt that purchases of equipment in the States will seem very attractive to some manufacturers but as time passes contracts placed by Latin Americans are likely to go to this yard in the Bahamas which may or may not confine its activities to vessels bigger than present-day motorships. For better or for worse, the Bahaman development will bear watching by shipbuilders and diesel engine manufacturers alike.

Elected President of ICEI

E. D. Tull

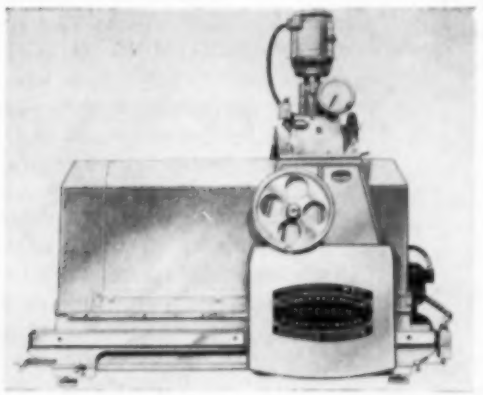
E. D. Tull, executive vice-president of the Cummins Engine Company, Inc., has been elected president of the Internal Combustion Engine Institute. He succeeds B. G. Van Zee, chief engineer of the Minneapolis Moline Company, who continues as a member of the board of directors. Other officers elected at the Institute's annual meeting in Chicago in February are: vice-president, F. C. Langston, special representative general management of the Harnischfeger Corporation; treasurer, C. E. Nelson, Jr., secretary and treasurer of Waukesha Motor Company and secretary, Phil Norton, executive vice-president of the Wisconsin Motor Corporation.

Diesel Authority Retires

John B. Huglen

John B. Huglen, one of Florida's leading and well known diesel engine authorities, retired recently after serving almost 28 years with the Cleveland Diesel Division of the General Motors Corp. In 1928, Winton Engine Co. assigned Mr. Huglen to Florida as their factory representative after 18 years as a marine engineer, during which time at the age of 22, he secured his unlimited chief engineers' license. In April 1954, he relinquished the managership of the Miami branch of the Florida Diesel Engine Sales, Detroit Diesel Div., General Motors Corp., for the new appointment of regional manager for Florida and the Caribbean area for Cleveland Diesel Div. of General Motors Corp. Mr. Huglen has traveled extensively throughout Florida and the West Indies to supervise installations of diesel engines.

New Wet Grinder



A new wet surface grinder which precision grinds all heads, blocks and manifolds, including those from newest overhead valve V-8's, is now being marketed by Peterson Welding Labs, Inc. These new grinders in the Peterson 900 Series have a work-piece capacity of 14 in. x 46 in. and automatic reversing which is regulated for each specific job. Other features include loading from overhead, fast set-up, accurate, dust-free, full-vision grinding, and easy conversion for grinding of heads, blocks and manifolds. Automatic feed is optional. With it, a test cut is made manually, the work inspected, the grinder reset for depth of cut and switched to automatic for completion of the job.

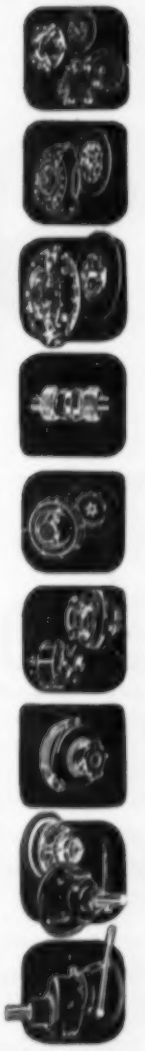
Accurate, precision grinding is assured by the use of a large, flat grinding wheel and ways which hook over and under the track to keep the carriage from "lifting" in the grinding process. A centrifugal-force-flush coolant system provides an "inside-out" flushing action which prevents wheel loading and permits a free cut, leaving a smooth surface finish of 30-80 R.M.S.

Peterson also manufactures a larger wet grinder of the same design and featuring an identical grinding principle. This large machine, in the Peterson 1000 Series, has a 14 in. x 66 in. work-piece capacity and readily handles heads, manifolds and blocks of all sizes even including large Waukeshas and D-8 Caterpillars. A special "roll-over" fixture is standard equipment for use with these grinders. This fixture speeds the set-up and resurfacing of new V-8 heads. The head is set-up, rolled over so the block face can be ground, then rolled over for the grinding of the manifold face.

Literature on these new Peterson Wet Surface Grinders is available direct from Peterson Welding Labs, Inc., 1423 Virginia Avenue, Kansas City, Missouri. ITS NEW

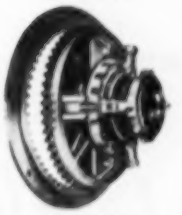
ROCKFORD

MEMO- Clutch must maintain it's torque



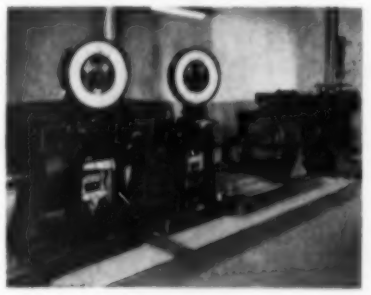
ROCKFORD CLUTCHES, of all types and sizes up to 18", are thoroughly tested for torque capacity — with this powerful, accurate Dynamometer. Arranged with an Automatic

OVER



CENTER

Cycling Device, this Dynamometer is also used for severe wear testing of facings, linkage, splines, etc. Let ROCKFORD engineers utilize our extensive clutch testing equipment to develop more efficient clutches for your products.



ROCKFORD
Clutch Division
BORG-WARNER
1321 Eighteenth Ave., Rockford, Ill.

CLUTCHES

Midwest Diesel News

By **L. H. Houck**

HYDRAULIC PRESSED Brick Co., of E. St. Louis, Ill., has taken delivery on a 1½ yd. Northwest crane with a Murphy diesel from O. B. Avery Co., Inc., St. Louis. The new unit will be used by the Haydite Division of the company.

A. B. BAER, Atlanta, Kan., has bought a White tractor with a 180 hp. Cummins from Wichita White Co., in Wichita, to be used in a general hauling business.

KOSTE Machinery Co., has delivered a Model 88 Oliver hydro-trencher, equipped with a Hercules diesel to Budrovich Excavating Co., of St. Louis.

REED COAL CO., Boonville, Ind., recently put another Bucyrus-Erie 22-B shovel to work. It has a UD-525 International diesel and Brandeis Machinery & Supply Co., Evansville, made the sale.

BRANDEIS MACHINERY CORP., Paducah, Ky., has delivered a 1½-yd. HHD Hough Payloader with Hercules DJXH diesel to William Brown, Harrisburg, Ill., for use in general work.

NORTHERN CO-OP., Wadena, Minn., has repowered an International truck with a 175 hp. Model JT-6-B Cummins diesel, to be used in general highway hauling. Engine was delivered by Cummins Diesel Sales Corp., St. Paul.

FABICK & CO., Jefferson City, Mo., has delivered a Caterpillar D7 with Cat 7S cable bulldozer and No. 25 cable control unit to Don Maggi, Rolla, Mo., who will use it in highway construction.

CLAY MINES of Russel Phillips, Linn, Mo., have added a Caterpillar D4 tractor with IT-4 Traxcavator and 75-in. bucket from Fabick & Co., Jefferson City, Mo., to speed up truck loading.

WESLEY ROBINSON, produce hauler in Wichita, has added a White tractor equipped with a 180-hp Cummins to his fleet. Delivery was made by Wichita White Co.

AN ASHLAND, MO. FARMER, James O'Neal, had put a Caterpillar D6 with 6S hydraulic bulldozer and No. 46 hydraulic control into service. He will use it for farm operations, terracing and farm ponds. Fabick & Co., Jefferson City, made the sale.

BOYD FRANKLIN, Dixon, Ky., has taken delivery on an International TD-14-A for use in construction and excavating work, from Brandeis Machinery & Supply Co., Evansville, Ind.

AN OLIVER OC-12, 1½-yd. high-lift tractor with Hercules diesel, has been delivered to Landwehr Excavating Co., St. Louis, by Koste Machinery Co.

MIDWEST DITCHING CO., St. Louis, has placed a 1-yd. Northwest with hoe hookup and Murphy diesel in ditching service. Equipment was sold by O. B. Avery Co., Inc., St. Louis.

WHEELING STEEL CORP., Steubenville, Ohio., has repowered an Ohio crane with a 165 hp. Model HRIP 600 Cummins diesel from Cummins Diesel of Northern Ohio, Inc., New Philadelphia.

LINGLE EXCAVATING CO., of St. Louis, has placed an Oliver OC-12 1½-yd. high lift tractor in service. It is powered with Hercules diesel and was sold by Koste Machinery Co.

EDGAR STEPHENS CONST. CO., Paducah, Ky., has bought an International TD-18-A with International diesel from

FAMOUS LAST WORDS:

"they wouldn't dare"

That's what they said the day before Pearl Harbor. Remember? But by now you'd think people would have learned. Let's face it—we must be ready for disaster at any moment. It may be an atom bomb—or it may be a fire, a flood, a hurricane. It's only common sense to be prepared for it, whatever it is. Take these precautions TODAY:

- ☐ **Enlist the help** of your local Civil Defense Director.
- ☐ **Check contents** and locations of first-aid kits.
- ☐ **Send staff** to Red Cross courses. They may save your life.
- ☐ **Promote preparedness** in your community. Your local CD Director can show you how.

Set the standard of preparedness in your plant city—check off these four simple points NOW.

SPACE FOR THIS **CIVIL DEFENSE** MESSAGE CONTRIBUTED BY

Ex Ft. Wadsworth

Brandeis Machinery Corp., of Paducah.

OLINGER CONST. CO., Huntingburg, Ind., has taken delivery on a Bucyrus-Erie 38-B shovel with a UD 1091 International diesel engine, from Brandeis Machinery & Supply Co., Evansville.

CALVERT DRILLING CO., Albion, Ill., has repowered a GMC truck for highway hauling operations with a 175 hp, Model JT-6-B Cummins diesel. Cumins Missouri Sales Corp., St. Louis, made the sale.

MORE AND MORE FARMERS are turning to track-type tractors. Virgil Cope, Williamsburg, Mo., bought a Caterpillar D4 from Fabick & Co., Jefferson City, Mo., and had it equipped with a hydraulic bulldozer and two Preco scarifiers.

A TD-14-A INTERNATIONAL with a Drott loader went to Radcliff & Berry at Orleans, Ind., from Brandeis at Evansville.

High Flow Filter

The new Arrow high-flow industrial filter is custom-designed for bulk handling of liquids, gases, diesel fuel, hydraulic fluids, gasoline, water, chemicals, oils, distillates and compressible fluids. Built in any size, it provides efficient filtration with low-pressure drop. The permanent porous bronze, cleanable filter element can be furnished for filtering out solids from 80 microns down to 6.5 microns. Company engineers will submit filter specifications to meet particular requirements and request inquirers to specify degree of filtration, type liquid or gas, flow required in gallons per minute, maximum operating pressure and pipe line diameter inlet and outlet. For full information write: Arrow Tools, Inc., 1951 South Kostner Ave., Chicago 23, Illinois. (ITS NEW)

They Build Them Big in Sweden!

Successful tests of the two giant main engines for the M.S. *Gripsholm*, the new flagship of the Swedish American Line, have been completed in Gothenburg, Sweden, it was announced recently by G. Hilmer Lundbeck, Jr., resident manager of the Line in North America.

The *Gripsholm* main engines are the biggest power plant ever built by Gotaverken, the leading Swedish manufacturer of marine power equipment, said Mr. Lundbeck, Jr. The main engines consist of two diesels capable of a power output of 22,600 ihp (18,600 ehp) at 117 rpm. In equipping the *Gripsholm* with diesel engines, the Swedish American Line management is following a tradition that was started with the construction of the original M.S. *Gripsholm* in 1925. She then was the first dieselized trans-Atlantic passenger vessel.

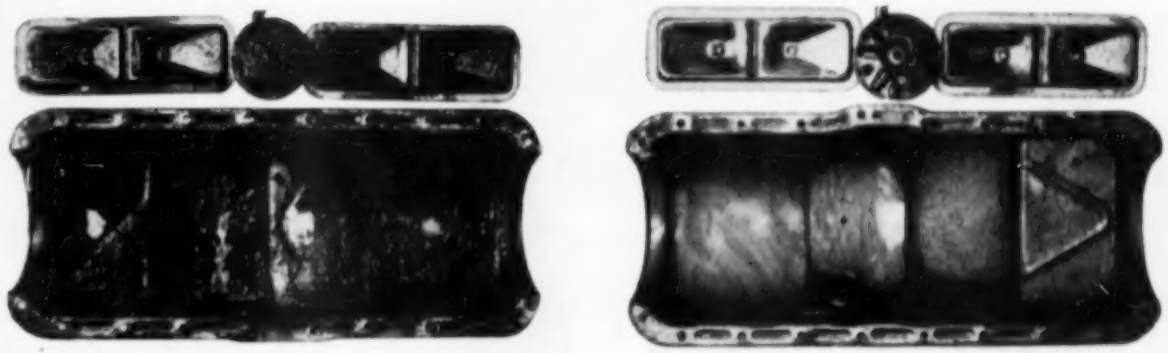
The two 9-cylinder *Gripsholm* diesels have a normal output of 19,800 ihp (16,200 chp). The bore of the cylinders is 760 mm, and the stroke is 1500 mm. Each diesel is 53 feet long and towers 26 feet over the engine room floor. Of particular interest are the bearing frames and the cylinder supports which have been cast instead of being welded, the latter method being more typical for the Gotaverken designs. In all, more than 38,000 parts were required for each of the two engines. The *Gripsholm* power plant is designed for the use of bunker fuel oil, which is less expensive than marine diesel oil.

The 24,000 ton M.S. *Gripsholm*, which is scheduled for launching this month, will be the biggest liner in the Swedish American fleet. She will be used both in trans-Atlantic and cruise traffic.

Although some parts of the engine work better for a long time when left alone, that's no excuse for running them until there is nothing at all left to work.

PROOF POSITIVE...

of SINCLAIR Diesel Oil Superiority!



This is actual photographic proof of the superiority of Sinclair Diesel Lubricants. On the left is a truck engine sump in which an ordinary oil was used. The clean sump on the right reflects conditions when a Sinclair Diesel Oil, SUPER TENOL, was used. This same top quality lubrication performance can be expected from all Sinclair Diesel Oils . . . *because Sinclair has the exact oil to match your engine's requirements!*

Sinclair RUBILENE® – These high viscosity index oils, refined by Sinclair's famed Phetone Process, have a long history of outstanding performance and are extensively used in stationary Diesel power plants today.

Sinclair RUBILENE HD – These high viscosity index oils contain additives which provide excellent detergent – dispersant properties, oxidation resistance, bearing corrosion prevention and anti-foam qualities. They are especially suitable for stationary Diesels as well as the higher speed Diesels used in industrial plants.

Sinclair GASCON® – These naturally detergent, straight mineral oils are recommended for slow, medium and high speed Diesels where carbon deposits, engine cleanliness and easy, low temperature starting is important.

Sinclair GASCON HD – Heavy duty detergent type oils compounded with selected additives to provide extra detergent dispersant properties, bearing corrosion prevention, oxidation resistance and anti-foam characteristics.

Sinclair TENOL®, SUPER TENOL and TENOL EXTRA – A series of heavy duty, detergent–dispersant type, high viscosity index oils refined by the Sinclair Phetone Process. Recommended for all high speed automotive fleet Diesel engines, and for some engines of late design in stationary, portable and marine service. All three series contain varying degrees of additive concentrations necessary to give outstanding performance no matter what the service condition under which your Diesel operates.

For further information about Sinclair's trouble-proof Diesel lubricants, see your Sinclair Representative, or write Sinclair Refining Company, Technical Service Division, 600 Fifth Avenue, New York 20, N. Y. *There's no obligation.*

SINCLAIR

DIESEL OILS

Winslow Appointment

John F. Bacher

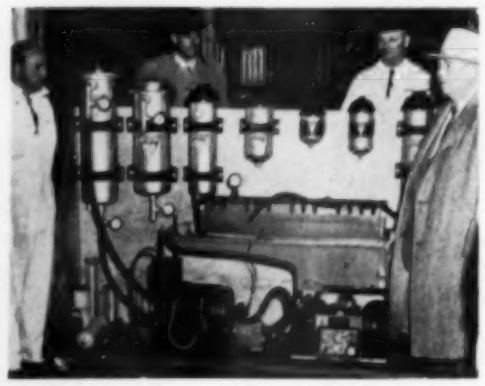
Distributors of Winslow filters and elements, coming from all parts of the United States and Canada to attend Winslow Engineering Company's national sales meeting in Oakland, California this week, were the first to learn of the appointment of John F. Bacher as the firm's new sales manager. His appointment was announced by Charles A. Winslow, founder and president of the 55-year-old California filtration equipment firm.

The announcement highlighted a meeting also marked by the presentation of technical papers by President Winslow, Vice-Presidents Laurence L. Moore and William G. Nostrand and other executives in the company's domestic and export sales organization.

Engine Life Demonstration

One day in mid-February, engineers of the Engine Life Products Corporation of El Monte, California, figuratively donned cap and gown and became professors for a day. The "Campus" was the Morrison-Knudsen Company of Boise, Idaho, leading operators in earth-moving and dam building construction. Morrison-Knudsen, always alert for ways and means of augmenting the efficiency of its staff, inaugurated a program of conducting a series of classes for a chosen group of employees on the various aspects of maintenance that affected their work on equipment.

The classes in filtration and standardization were, by arrangement, the responsibility of Engine Life Products Corporation. The men present were representatives from jobs, now in operation all over the world. However, their problems were essentially the same but had to be accomplished under varying conditions.



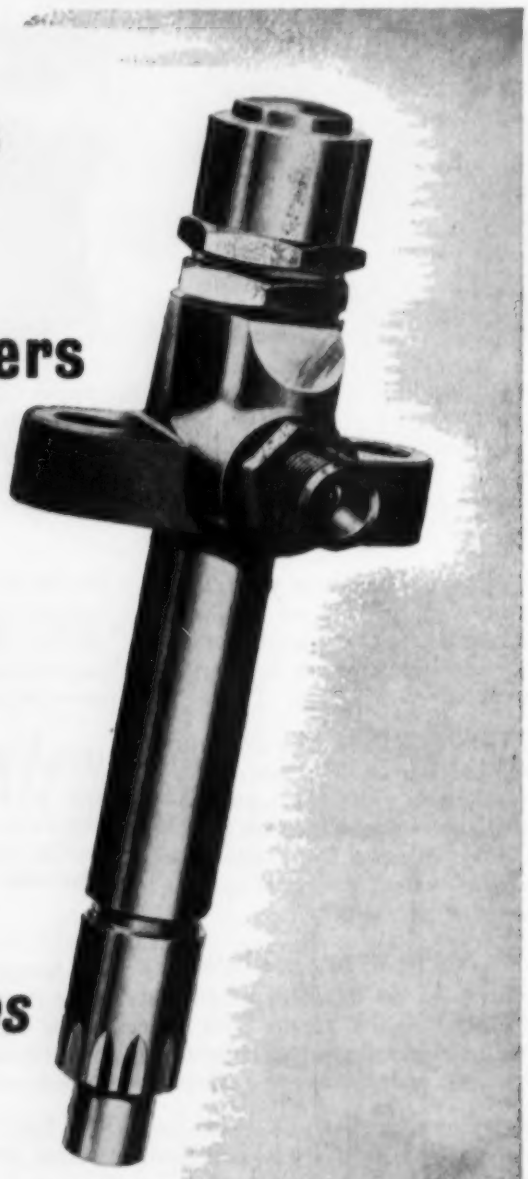
The Engine Life Products Corporation turned professorial during the maintenance training "school" sessions of the Morrison-Knudsen Company at Boise, Idaho, February 16. Shown is the demonstration unit used for instruction in the mechanics of modern filtration. The hookup comprises filter cases, crank case, pumping system and control lines, simulating actual operation. Engine Life Products "professors" are (left to right): Kenneth D. Camp, field engineer; Winston R. Fuller, president; L. N. Johnson, field engineer; and John J. Meyer, sales manager and chief field engineer.

The first part of this school was conducted in the Boise Shops. The Engine Life Products Corporation furnished a display unit that simulated the hydraulic system of engines commonly used in the industry. Along with this display unit actual full-flow filters and shunt type filters were put into operation which demonstrated and schooled the men in how each unit worked.

It was demonstrated how full-flow filters when properly engineered and installed were practically a must in the earth moving industry. It was also demonstrated how full-flow filters improperly engineered and installed would damage an engine, thereby adding to the cost of their maintenance program. These demonstrations were simulated to school the men under all sorts of atmospheric and working conditions.

The afternoon session was conducted in the new Conference and Board of Directors Room of the Morrison-Knudsen Company. This part of the program covered the schooling standardization of filter equipment on engines on practically every piece of equipment used in the industry. It was pointed out how all equipment could be standardized which would simplify their maintenance program and solve their purchase, inventory and warehouse problems. After the formal presentations of these points, the session wound up with a question and answer period.

The World's Leading Manufacturers of FUEL INJECTION EQUIPMENT for Diesel Engines



C.A.V. Depots and Service Agents in over 100 Countries.

C.A.V. DIVISION OF LUCAS ELECTRICAL SERVICES INC., 653 TENTH AVENUE, NEW YORK, 36, N.Y.
Sales Office: 14820 DETROIT AVENUE, CLEVELAND, 7, OHIO.

AP 174-754

LMOA Pre-Convention Meetings

The Locomotive Maintenance Officers' Association has announced the coming pre-convention meeting dates. The session, to be held April 17, 1956 will take place at the Southwestern Railway Diesel Club, Texas State Hotel, Houston, Texas. The 1956 topic is "Progress Report On Extending Service Life of Pistons, Rings, Liners and Cylinder Heads."

Additional pre-convention meetings have been scheduled for the following dates: May 8th in St. Louis; May 15th in Louisville; May 17th in Cleveland; May 22nd in Memphis; May 22nd in St. Paul; May 24th in Jacksonville; May 28th in Denver and June 12th in Jacksonville.

Members and friends are urged to attend any meeting they can with a minimum of inconvenience and expense. The exchange of ideas has, in the past, resulted in many efficiencies in operation of diesel equipment.

District Manager at Kansas City

The appointment of John T. Klein as district manager of Mack Trucks in Kansas City, Mo., was announced by Lewis E. Minkel, vice president and sales manager. Prior to his assignment as head of the newly re-established Mack District, Mr. Klein had been district manager in Omaha, Neb., and St. Paul, Minn.

A native of Milwaukee, Wis., and a graduate of Marquette University there, Mr. Klein joined Mack in that city in 1949.

Names Manager of Its Eastern Division

The promotion of Andrew J. O'Rourke from acting manager to vice president and manager of Mack Trucks' Eastern Division was announced recently by Lewis E. Minkel, vice president and sales manager. With the company since 1938, Mr. O'Rourke was named district manager of the Queens Branch in 1945, and in 1952 became Metropolitan sales manager. In 1955 he was appointed Eastern Division sales manager.

Mr. Minkel also announced that the Eastern Division's Headquarters, handling sales of trucks, buses and fire equipment, is being transferred from Manhattan to the Mack building adjacent to the New Long Island Expressway at 58-40 Borden Avenue, Maspeth, Queens.

Sport Fishing Boats

Due to the increasing number of offshore deep seat sport salmon fisherman, three new sport fishing and charter boats are being built for the Westport area by the Grandy Boat Company, Seattle, Washington. These are the very latest in design and are from the board of Edwin Monk, well known Seattle architect.

The *Frank L. III* was delivered recently by Grandy Boat Company at their Seattle plant to the owner, Frank L. Lambertsen, and left immediately for Westport where it will engage in commercial crab fishing. It is powered with a Cummins HRM 600—165 hp—2 x 1 reduction —diesel motor, supplied through North Coast Marine Engine Company. During the summer season the boat will engage in sport fishing and charter work.

A sister-ship, the *Fleetfisher*, was also launched at Grandy's and was delivered to Harry L. Lewis of Lewis Charters, Westport, Washington. It will be powered with the General Motors Series 71 diesel. The *Fleetfisher* will engage in sport fishing and charter work at Westport. A third boat, as yet unnamed, is now at the framing stage and will be delivered early in the year to Leo Bordeaux who will likewise engage in the sport fishing and charter work through the Lewis Charters. This vessel will also be powered with the GM Series 71 diesel. Both power plants will be supplied through Evans Engine Company.

The boats, 42 ft. x 14 ft., were designed for their purpose and have an unusually generous amount of deck space, a modern galley and sleeping quarters forward. It is predicted that they are the forerunner for a growing fleet of modern and well designed boats to be used in this new industry.

Appointed Agents

Appointment of Power Machinery Company as agents for its new Alcotwin line of finned tube heat exchangers has been announced by Alco Products, Inc. Under the terms of the agreement, Power Machinery will be the exclusive agents for the new equipment in Kansas, Oklahoma, Texas and Louisiana. In a joint statement, E. N. Sieder, Alco's marketing manager for thermal products, and H. C. Wieghard, president of Power Machinery Company, said that the addition of the Alcotwin to the Alco line of conventional shell and tube equipment will enable PMC to offer a complete line of heat transfer products for every process requirement in the Southwest.

In addition to Mr. Wieghard, PMC personnel concerned with the new sales arrangement include W. T. Stewart, manager of heat exchanger products; Richard Henry, manager of the company's Houston office; and C. E. Shockey, Kansas City manager.

Five Straight REA Champions Served by Young Coolers

Five years in a row Young Radiator Company Cooling Units have contributed to the efficiency of champion REA plants! These winners were equipped with Young "MonoWeld"® Jacket Water Coolers (described below) and Young space-saving Aftercoolers. Wherever Diesel engine heat transfer such as this is involved, Young has the experience and the *proved performance record* to bring you a new high in engine efficiency . . . deliver more cooling . . . use less valuable horsepower to do it! That's just part of the Young story. Call or write for further details today.

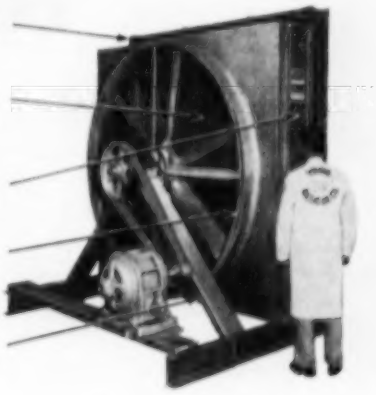
Extremely rigid steel channels support core sections and plenum chamber mountings.

Readily replaceable unit core sections. Vertical tubes boost core strength.

Gas and lube oil cooling coils may be used between fan and liquid cooling core.

Special roll-formed fan ring and fan location provide maximum efficiency.

"A" frame fan support provides maximum strength, minimum resistance to air flow.



Put Young Talent to work for you . . .

Solving heat transfer problems is what we do best because it is our very reason for being. You, too, can harness the power of Young engineering talent. Write, wire or call without obligation.

Write dept. 406-D for FREE Catalog

Young RADIATOR COMPANY
RACINE, WISCONSIN
Creative HEAT TRANSFER ENGINEERS FOR INDUSTRY
Heat Transfer Products for Automotive, Aviation and Industrial Applications.
Heating, Cooling, Air Conditioning Products for Home and Industry.
Executive Office: Racine, Wisconsin, Plants at Racine, Wisconsin, Mattoon, Illinois

IH To Construct Research Plant

The International Harvester Company is planning to build a multi-million dollar research and engineering plant on its large experimental farm outside of Chicago. Construction is contingent on the easing of local building restrictions. President John L. McCaffrey stated that if the civic officials give the go-ahead sign by approving zoning changes, he will recommend to the board that assent be given for the erection of the center.

The farm has been used since 1917 for the testing of farm machinery. The new center would be used by IH's farm tractor and implement divisions and the consumer relations staff. Some 1,000 persons scattered throughout the Chicago area who now are concerned with the creation, designing and testing of farm equipment would be brought together at the new plant.

Close In Maneuvering

With 40 pieces of earthmoving equipment now in use, the grading of land for housing projects has become big business for the Arnolt Construction Company of Metuchen, New Jersey. Grading is done both before and after buildings are constructed and the work ranges from leveling hills and building roads to filling in around basement walls. One piece of equipment, a Euclid S-7 scraper powered by a General Motors 4-71 diesel engine, is used to maneuver in tight corners to drop loads of top soil close to houses under construction. The unit is licensed for travel over highways and moves at 25 mph under full load.

Plant Expansion

The Frank C. Hough Co. of Libertyville, Illinois, has announced the construction of a 55,000 square foot addition to its plant to meet the increased demands for Payloader tractor-shovels. The new buildings, which are expected to be completed this year, will give the plant a total of 368,000 square feet, making it the largest plant in the world devoted exclusively to the manufacture of tractor-shovel equipment.

The new facilities will provide an area 32 times greater in size than the original property was when the company moved here from Chicago sixteen years ago. Mr. Frank G. Hough, a pioneer in tractor-shovel design and manufacture, first conceived the idea of handling bulk material with power equipment in 1920 when he developed one of the first hydraulically-operated shovels for use with then existing equipment.

Until 1939, activity was confined to design and production of front-end loader attachments for conventional tractors manufactured by other concerns. The first unit-design tractor-shovel was developed at the time of the move to Libertyville and the introduction of the Payloader models.

Enterprise District Manager

Stephen Reed has been named Tulsa district sales manager for Enterprise Engine & Machinery Co. His territory covers Arkansas, Oklahoma, and the Texas Panhandle, particularly including service to diesel engine requirements of the petroleum industry. The Enterprise district office in Tulsa is at The Hotel Mayo.

In announcing Mr. Reed's appointment, A. W. Ostrander, general sales manager of Enterprise, noted that Mr. Reed has had extensive industrial diesel experience in both northwestern and southwestern states. His most recent assignment has been in contact sales for Enterprise at the firm's San Francisco home office. He holds a degree in mechanical engineering from Drexel Institute of Technology, Philadelphia.

This new 1400 H.P. Superior Diesel was installed in 1955 in the 118 foot tug "Johnstone Straits" owned by Straits Towing Ltd., of Vancouver, B. C. Due to the rugged open chamber Superior combustion system and the special know-how of White Diesel engineers, *the tug now operates almost exclusively on low cost bunker fuel!* This has resulted in a 53% fuel cost savings!

The tug is in service on the rugged British Columbia Coast, towing record-size log booms and large sea-going barges. The new 1409 H.P. direct-reversing Superior Diesel swings an 88" diameter, 36"/43" pitch wheel at 350 turns.

Due to the engine's superior performance, when operating on heavy fuel, Straits Towing has made it a matter of practice to use heavy fuel during normal maneuvering. When the engine is to be secured for short periods, up to half an hour, they also stop and start it on heavy fuel.

If fuel savings of this sort, plus the famous dependability, low maintenance cost and minimum down time of Superior and Atlas Diesels interest you, please get complete details from the nearest Sales and Service office listed below. There is a Superior or Atlas Diesel for every marine use from 100 to 2105 B.H.P.

Superior ENGINES · ATLAS Superior DIESEL ENGINES · White DIESEL

WHITE DIESEL ENGINE DIVISION

THE WHITE MOTOR COMPANY • *Plant and General Offices: Springfield, Ohio*

SALES AND SERVICE POINTS: Gloucester, Mass. • Houston, Ft. Worth, Texas • San Diego, Oakland, Terminal Island, California • Ketchikan, Alaska • Washington, D.C. • Portland, Astoria, Oregon • Casper, Wyoming • Halifax, Nova Scotia • Vancouver, B.C. • Park Rapids, Minnesota • New York • Chicago • Seattle • New Orleans • St. Louis • Wichita, Kansas

Twin Disc Publication Available

"The Trend is to Torque Conters in the Construction Industry" is the feature story in the latest issue of Production Road magazine. It is told in absorbing story form, complete wtih on-the-job photographs and charts. The publication has just been released by Twin Disc Clutch Company, Racine, Wisconsin—leading manufacturer of friction and fluid drives for powered industrial equipment. The magazine also gives timely tips on efficient power transmission to all powered equipment users. A copy is available without cost. Simply write to Production Road, Twin Disc Clutch Company, Racine, Wisconsin.

New Slide Film Release

Delco-Remy announces the release of a new sound slide film in color entitled "An Introduction To The Authoritative Electrical System" (DR-9010K). This film contains approximately 80 frames and is narrated on two sides of a 16-inch record. The running time is 18 minutes. To accompany this film is a 22 page booklet (DR-9010) in black and white and contains illustrations taken from the film. Both are basically fundamental and nontechnical.

The film may be purchased or obtained on a loan basis and returned after showing. The booklet is free in limited quantities upon request from: Technical Editor, Technical Literature Section, Delco-Remy Division, General Motors Corporation, Anderson, Indiana.

To Acquire Trucking Firm

Consolidated Freightways of Portland, Oregon, is negotiating to acquire control of Motor Cargo and two subsidiaries and four related companies through purchase of stock for $9.6 million. The completion of the transaction awaits approval by the stockholders and the Interstate Commerce Commission.

Services of both companies join at St. Paul and Chicago. Motor Cargo operates in Cleveland, New York, Philadelphia, Washington, Baltimore and several other cities.

Indiana Toll Road

A 4½ yard bucket on a new 71-B Bucyrus-Erie dragline powered by a GM 6-110 diesel engine is contributing to the sizeable earthmoving job along the Indiana East-West Toll Road. The job is that of Peter Kiewit Sons' and Condon-Cunningham Companies and calls for moving million cubic yards of fill and paving a five-mile double strip of highway and a service area near Gary, Indiana. The fill was to be moved within a period of five months to help meet a 1956 completion date for the entire job.

Euclid Maintenance School

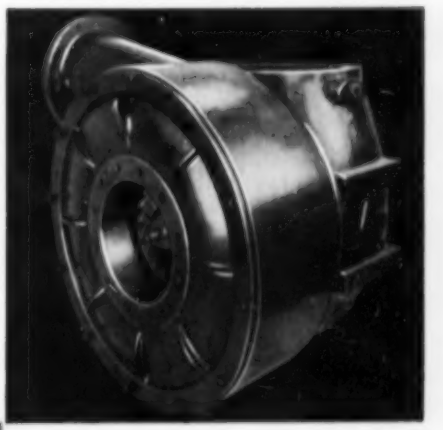
Maintenance personnel of the Morrison-Knudsen Company recently completed a training program conducted at Boise, Idaho, by a mobile training unit of Euclid Division, General Motors Corporation. Utilizing mock-ups, cutaways, and component assemblies, the instruction covered preventive maintenance and service procedures for the entire line of Euclid earthmoving equipment. Special emphasis was given to the models owned and operated by Morrison-Knudsen.

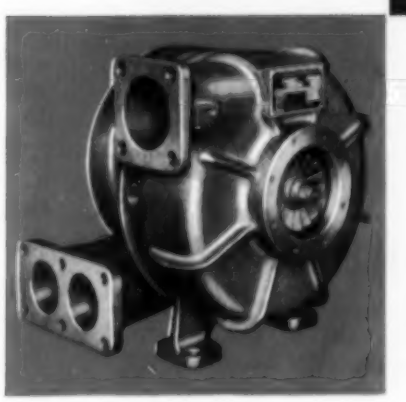
The training school is part of Euclid's program to help owners get maximum production from their Euclid machines at the lowest maintenance cost.

Seems like do-it-yourself doctrine is trying to make itself felt in the diesel field where we find Mr. Fixit always too busy to keep his own job up to snuff because he spends so much time lecturing others on how to do their work.

Millions of hp of Experience!

...keeps ELLIOTT ahead in turbochargers





ELLIOTT has a background of more than 16 years experience in DESIGNING, MANUFACTURING and APPLYING turbochargers to diesel engines. During this time, millions of horsepower of diesel engines have been turbocharged by Elliott. These turbocharged engines cover the field—stationary plants, large motorships, fishing vessels, luxurious yachts, railroad locomotives, trucks, off highway tractors, well drilling rigs, etc.

This experience means added assurance of dependability in turbocharged diesel engine performance. Make sure your next diesel engine has a "performance-proven" Elliott turbocharger.

ELLIOTT Company
JEANNETTE, PENNSYLVANIA

MG-1

STEAM TURBINES • MOTORS • GENERATORS • DEAERATING HEATERS • EJECTORS • CONDENSERS • CENTRIFUGAL COMPRESSORS • TURBOCHARGERS • TUBE CLEANERS • STRAINERS

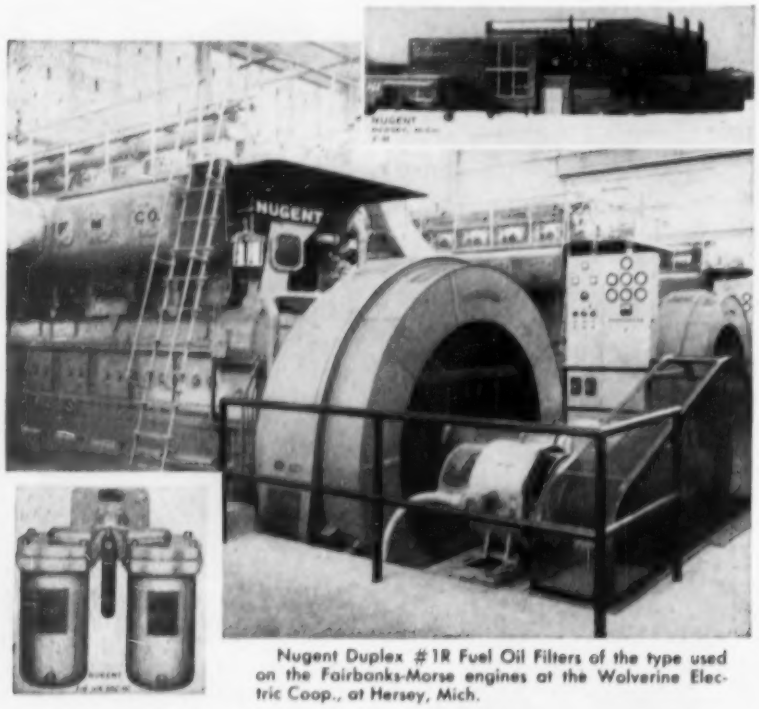
New Diesel Fuel Additive

Development of a new diesel fuel additive to eliminate the resultant harmful effects of water and moisture accumulating in #2 diesel oils has been announced by the Columbia Bedford Corporation of New York, leaders in the petroleum industry for 65 years. It is to be marketed under the name of Diese-L-Dri.

(Prior to public announcement, Diese-L-Dri was tried and tested under various conditions and applications in the marine, industrial and automotive diesel fields) and the efficiency and over-all results are well documented. The additive absorbs water and moisture, homogenizes it with diesel fuel oil and through atomization, it is completely burned in the injection system without harmful effects, or clogging or damaging the injection system. Sludge, resins, and gums are disintegrated. Sticky valves and carbonization of rings is eliminated. Proper combustion insures clean engine exhaust and increases power up to 20%. Fuel tanks and lines are maintained rust free, and clogging of fuel oil filters are prevented. The total results add up to increased engine efficiency and lower maintenance and repair costs. Actually, the water accumulated in your fuel tanks is efficiently burned and stretches the total amount of diesel fuel burned.

Heavy accumulations of water and sludge in fuel oil storage tanks can be eliminated without the necessity of costly draining and manual cleaning methods by the use of Diese-L-Dri in proper proportions. The cost of Diese-L-Dri is low as, after an initial application, one gallon will treat 3000 gallons.

Columbia Bedford Corporation also produces a companion product, Dualene-Kleen Fuel-Detergent, for use with the heavier fuel oils such as Bunker "C" and #6. Domestic sales are handled by the Columbia Bedford Corporation, 36 Bridge Street, New York 4, N.Y., and export sales by W. H. Roder & Co., Inc., 39 Pearl Street, New York 4, N.Y. Descriptive literature, engineering data, laboratory reports are available. Dealerships, both domestic and foreign, are available. (ITS NEW)



Nugent Duplex #1R Fuel Oil Filters of the type used on the Fairbanks-Morse engines at the Wolverine Electric Coop., at Hersey, Mich.

NUGENT FUEL OIL FILTER USER 3-TIME WINNER OF R.E.A. AWARD

Our congratulations go to the management and staff of the Wolverine Electric Cooperative at Hersey, Mich., winner of the 1955 Diesel Progress Plaque for the most efficiently operated R.E.A. plant. Their capable efforts have been responsible for three such awards over the past four years.

Plant equipment includes three Fairbanks-Morse dual-fuel engines with fuel oil protection for each supplied by a Nugent Duplex #1R Filter. Vital pilot fuel oil is kept free of dirt and moisture by their filtering action. Foreign material that might clog injection units, cause excessive engine wear, or lead to faulty combustion is eliminated from the system by the use of these Nugent Filters.

Each unit of the Duplex #1R Filter functions independently or in parallel with the other, which allows cleaning to proceed with no operational interruptions. The filtering medium is a large area bag of closely woven, lintless, acid resisting material that is easily cleaned for reuse or is replaceable at low cost.

Nugent Filters are available in complete size ranges to satisfy your needs. Write for full data, outlining your filtering requirements.

NUGENT TRADE MARK

Wm. W. Nugent & Co., Inc.
3441 Cleveland St. Skokie, Illinois

Established 1897

OIL FILTERS, OILING AND FILTERING SYSTEMS, TELESCOPIC OILERS, OILING DEVICES, SIGHT FEED VALVES, FLOW INDICATORS
Representatives in Boston • Cincinnati • Detroit • Houston • La Junta, Colo. • Los Angeles Minneapolis • New Orleans • New York • Philadelphia • Portland, Ore. • San Francisco Seattle • St. Louis • Tulsa • Representatives in Canada: Montreal • Toronto • Vancouver

Delco-Remy Booklet

Delco-Remy announces the 1956 edition of the DR-324S Test Specifications booklet. This booklet has been revised to include the most recent specifications for all active models of Delco-Remy batteries, coils, distributors, generators, cranking motors, regulators and magnetic or solenoid switches. It is published for the convenience of persons engaged in the maintenance and testing of automotive electrical equipment in the service field.

The concise form of the DR-324S Test Specifications booklet makes it a popular item for use by service engineers, schools service stations and garages. The list price of the DR-324S is 25¢ each, with a special price for quantities of ten or more. Individuals or businesses wishing to obtain this booklet should contact a local United Motors Service dealer or write direct to United Motors Service, 3044 W. Grand Boulevard, Detroit 2, Michigan. Schools and government agencies should write direct to the Technical Literature Section, Delco-Remy Division, Anderson, Indiana.

Florida Sales Representative

The appointment of D. P. Gosheff as sales representative of the Detroit Diesel Engine Division of General Motors-Florida branch has been announced by R. A. Hill, branch manager. In his new capacity, Mr. Gosheff will coordinate the diesel sales activities of Florida marine and industrial dealers with operations at Detroit Diesel branch headquarters at Miami and sub-branch at Jacksonville. In Jacksonville he will work with Roy Kuhns, who is manager of that operation.

Mr. Gosheff's recent affiliation was with Chrsyler Corporation where he was sales representative contacting manufacturers, and industrial and marine engine dealers in the 9-state area of the Mississippi Valley. He was also formerly a sales representative of the General Engine and Equipment Company of Tampa, Detroit Diesel dealers for the Florida West Coast.

Develops and Markets Rectangular Motor

The first rectangularly shaped motors, designed to give the same output as comparable conventional round motors but in significantly less space, have been developed and are now being marketed by the Leece-Neville Company, Cleveland.

The new line is available in six, 12, 24 and 32-volt ranges with outputs up to 140 ounce inches. Initial applications will be in the automotive and truck industry for use in window regulators, seat adjusters, air conditioning units, and other areas where space is limited.

Rectangular construction of the new motor is made possible by a unique design in which the flux path is axial with the armature shaft as opposed to conventional motors whose flux path is concentric with the shaft. The special flux path in turn is made possible by a special pole piece pattern. The motors feature all-welded construction with 3/16-inch-thick stampings. This construction provides maximum stability and resistance to twisting, and eliminates armature misalignment often caused where motors with through-bolts are subject to constant vibration.

Maximum flexibility of installation is another feature of the new models since the broad flat surfaces of the motors permit attachment of assembly bolts in any position according to customer specification. In addition, the shaft can be extended from both ends for double load application, the motors can be made waterproof, and larger sintered bronze bearings at each end of the shaft eliminate the necessity of oil wick reservoirs. Additional information may be obtained from the Leece-Neville Company, 1374 East 51st St., Cleveland 3, O. (ITS NEW)

To Build Offshore Drilling Unit

The Bethlehem Shipbuilding Yard at Beaumont, Texas has received a contract from the Penrod Drilling Company of Shreveport, Louisiana to build a portable submersible, self-stabilizing elevated deck drilling vessel for service offshore in the gulf. The new unit, generally a sister ship of the S-55 being built for the California Company, is to the designs and specifications of Friede and Goldman, Inc., naval architects. Like the S-55, the new Penrod Unit was designed to operate in 75 ft. of water in the open sea. Its over-all length will be 190 ft. and it has a molded beam of 150 ft.

The vessel was designed in accordance with principles developed by the naval architects, and brings to seven the number of units designed by the same naval architects, now building in three Gulf Coast shipyards, and the first to be built by Bethlehem to Friede and Goldman design.

The Penrod Drilling Company is one of the Hunt interests, controlled from Dallas, Texas.

Log Handling Unit

Clark Equipment Company's construction machinery division has introduced the Michigan Model 175 tractor logger. It features the Clark-engineered and built power train, with a heavy duty torque converter, power shift transmission and planetary wheel drive and steer axles. The rubber-tired logger lifts 20,000 pounds at zero mph; at 4 mph it is rated at 14,000 pounds. Two specially designed log clamps can handle a log six feet in diameter, or several smaller logs. Hydraulically-operated, they close to 16 inches, or can be adapted to close entirely.

When fully raised to a height of 11 feet, 7 inches, the three-foot-long lifting forks can be tilted downward at a 39 degree angle, enabling the operator to reach over a row of logs for pick-up. Spikes on the bottom and top sides of the clamps permit the operator to pull a log in or flip it away.

The Clark torque converter automatically boosts torque up to 300 per cent as drawbar requirements increase, providing an increasing flow of power to pull through ruts or move heavy loads. Operator fatigue and maintenance problems are reduced by the elimination of the conventional clutch. Driving controls consist of two finger-tip levers on the steering column, one for high-low, the other for forward-reverse. The machine's top speed is 27 mph. Power shift transmission permits the operator to shift instantly from reverse even while moving. The logger has four-wheel drive and rear-wheel power steering, with an oscillating rear axle that maintains ground contact over rough terrain.

Final planetary reductions in the wheels reduce the torque load on axle shafts by 70 per cent. Final reduction is as close as possible to the point where the final tractive effort is applied. Weighing 34,000 lbs., the logger has vacuum power boosted four-wheel brakes and four 18.00-25.20 ply tires which provide smooth riding under all load conditions.

Instant starting, even at extremely low temperatures, is facilitated by a 24-volt electrical system. A 50-gallon fuel tank permits the Logger to work an average full day without refueling.

Over-all, the tractor logger is 8 feet, 3 inches high over the air cleaner cap, 8 feet, 7 inches wide over the tires and 21 feet, 11 inches long with the forks at carry position. It is available in both gasoline and diesel six-cylinder engine models, with the former rated at 127 hp and the latter at 133 hp. Both have a 426 cubic inch piston displacement. Additional information the new Michigan model 175 Tractor Logger may be obtained by writing Construction Machinery Division, Clark Equipment Company, Pipestone Road, P.O. Box 599, Benton Harbor, Mich. (ITS NEW)

"Andrew B"

Now in the sand and gravel trade on the Cumberland River is the powerful new diesel towboat, the *Andrew B*. Designed and built by the St. Louis Shipbuilding & Steel Co. for the Cumberland River Sand and Gravel Company, the 1400 hp ship recently completed her delivery trip from St. Louis to Nashville, Tennessee, after picking up a loaded tow at Paducah, Kentucky. The boat proved her outstanding maneuverability and easy handling on the trip up the Cumberland River.

The *Andrew B* was christened in Nashville on January 18, 1956 by Mr. A. B Crichton, widow of the man for whom the boat is named. The towboat is 108 ft. in length by 26 ft. in breadth, with a normal draft of 6 ft. 3 in. Propulsion is provided by two Superior Model 40-S2X-8 8-cylinder supercharged, 8½ in. x 10½ in. diesel engines. Each engine is rated at 700 hp at 800 rpm. The main engines and reduction gears are completely controlled from the pilot house through Westinghouse pneumatic controls. The jacket water is cooled through Graham Manufacturing Co. heat exchangers. There are also installed Hilco lube oil purifiers and Ross lube oil coolers.

Two 23.5 cfm Quincy air cooled air compressors driven by 5 hp Fairbanks, Morse Co. motors with Cutler Hammer controls, provide air for main engine starting, pilot house controls and air whistle.

To Build Barge

It is planned to build some Thames River type barges for use in the Metropolitan New York area with the noteworthy difference that the original type used on the Thames is navigated under sail while the American version will be diesel equipped. We have been requested to withhold the names of the principals.

How much **of your engine maintenance bill is due to repair of breakdowns that could have been avoided—*if you'd had advance warning?***

At a fraction of that cost, Alnor Exhaust Pyrometers offer you a constant check of engine performance—advance warning of

Cylinder Overload **Preignition**
Scaled Jackets **Clogged Ports**
Detonation **Faulty Injection**

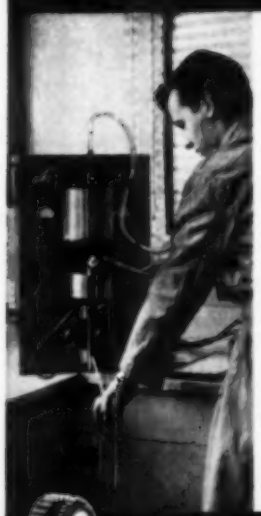
Get the best from your diesel—minimum fuel consumption per horsepower and long service uninterrupted by foreseeable breakdowns. Get constant protection of your engine, cylinder by cylinder, with an Alnor engineered Exhaust Pyrometer System.

Get Full Information—Quickly! **Your nearby Alnor Diesel specialist is conveniently listed in the classified directory. Ask him to help you select the Pyrometer and thermocouple assembly designed for your engine. Or send for Bulletin 4361 with complete details of the full Alnor line of Pyrometers.**

ILLINOIS TESTING LABORATORIES, INC.
Room 508, 420 N. La Salle St.,
Chicago 10, Illinois

Another of the Reasons Behind Brad Foote Quality—

CARBON DETERMINATION



- In hardening gear teeth by carburizing, carbon content and depth of penetration are vitally important. BRAD FOOTE insures precise control of these factors through metallurgical tests with equipment developed specifically for this purpose.
- A test bar goes through the complete carburizing and heat-treating cycle with every batch of carburized gears. Shavings are taken from this bar at carefully measured depths. Chemical analysis of these shavings gives complete and precise data on carbon content and penetration.
- Carbon determination tests are only one of many metallurgical controls that insure the uniform quality of BRAD FOOTE Gears. Metallographic examination, hardness testing, chemical analysis—these are just a few of the quality checks provided by BRAD FOOTE's completely equipped metallurgical laboratories.
- Add these precise controls to specialized production and heat-treating equipment and a wealth of detailed experience in producing gears of all types—you begin to appreciate why BRAD FOOTE can produce better quality gears at substantial savings.
- Find out how BRAD FOOTE quality can save you money. Send us the specifications on your next job for quotation. No obligation of course. BRAD FOOTE MAKES ALL TYPES OF GEARS—IN A COMPLETE RANGE OF STYLES AND SIZES

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New Koehring Crane

Production of a Cruiser crane version of the Model 205 excavator has been announced by the Koehring Company of Milwaukee. One-man operated, the Cruiser has a 15-ton lift capacity, ½-cu. yd. dipper capacity and a top travel speed of 21 mph for fast shuttle operation. Gradability tests showed that the machine can negotiate 25% grades in low gear.

The Cruiser Crane is best suited for odd job service around industrial plants, for municipal and utility service, in warehouses and storage yards and in large area installations where handling equipment must be shifted quickly from one job location to the next. Economical in operation, the 205 Cruiser is handled by one man from the same control position for both travel and work. One engine supplies all power and a 4-wheel drive arrangement provides the extra tractive power to pull out of trouble at any time. Other features built into the Koehring Cruiser Crane to promote handling ease include power steering, air-hydraulic brakes and a standard torque converter for smooth operation and improved gradability. The unit has a short turning radius of 27½-feet. In addition to the 15-ton lift capacity (rated 85% of tipping), the unit can lift a load of 12.7 tons (without outriggers) over the back and travel.

The all-welded chassis provides ample stability for crane and clamshell work. The Cruiser body is equipped with outriggers front and back for extra support during stationary lifting operations. The turntable swings on four adjustable hook rollers that resist tipping in either direction. For special high lifts, the standard 25-foot boom can be lengthened to a maximum of 55-feet plus straight boom jibs of 15 to 30 feet. Safety boom limit stops are standard equipment on the new Koehring Cruiser. Power boom lowering also is standard.

Total weight of the unit is 29,400 lbs. with the rear axle load without counterweight, listed at less than 18,000 lbs. to conform with highway regulations. More detailed information and prices on the 205 Cruiser Crane may be obtained on inquiry to the Koehring Company Sales Office, 3026 West Concordia Avenue, Milwaukee 16, Wisconsin. (ITS NEW)

Joins I.O.T. Fleet

Soon to enter the oil trade for the Inland Oil and Transport Co. is the new 1800 hp towboat *Lady Mignon*. Designed and built by the St. Louis Shipbuilding & Steel Co., the *Lady Mignon* is the second towboat built by I.O.T. The *Lady Linda*, built in 1952, has made an enviable record for speed and dependability ever since she has been in service.

The new vessel will be christened soon by Mrs. Sid Siteman for whom the boat is named and whose husband is President of Inland Oil and Transport Co., The hull of the *Lady Mignon* is 124 ft. by 30 ft. by 10 ft., 6 in. with a draft of 7 ft., 6 in. The hull is of heavy construction framed longitudinally and transversely, and all bulkheads are of ⅜ in. plating with vertical and horizontal stiffeners. The bow is of a modified model type, and the stern has long easy lines leading to two well rounded tunnels. The boat is specially designed for the high speed oil service.

Propulsion is through two General Motors Model 12-567 diesel engines, each developing 900 hp. at 750 rpm. The 6 ft., 6 in. diameter cast steel propellers turn at 250 rpm through 3:1 ratio Falk Reverse-Reduction gears with Airflex Coupling Clutches. The shafts turn in Goodrich Cutless Rubber Bearings in the stern struts. Cooling of the main engines is accomplished by circulating

WHITLEY COLLINS — Portrait by Fabian Bachrach

"Over 80% of Northrop personnel buy U.S. Savings Bonds . . ."

"Our recent Payroll Savings Campaign at Northrop demonstrated the belief of our personnel and our company in the basic fundamentals of American good citizenship—staunch support of our Country and personal thrift.

"At the completion of the campaign we had over 17,000 regular savers—over 80% of all Northrop personnel buying U. S. Savings Bonds regularly on the Payroll Savings Plan. Every employer should stage a similar campaign for the benefit of his personnel and the economic welfare of our Country."

WHITLEY COLLINS, *President*
Northrop Aircraft Company

If less than 60% of your personnel are Payroll Savers, do something about it. A phone call, telegram or letter to Savings Bonds Division, U. S. Treasury Department, Washington, D. C., will bring prompt assistance from your State Director. He will help you install, or revitalize a Payroll Savings Plan, through a simple, person-to-person canvass which your personnel will be glad to conduct. That's all you have to do—your men and women will do the rest.

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Editor—DIESEL PROGRESS

the jacket water through the highly efficient St. Louis Shipbuilding & Steel Co. closed duct skin cooling system.

Electric power is provided by two 60 kw. 3/60/220 a.c. generators driven by General Motors 6-71 diesels. The generators as well as the main engines use the skin cooler for circulating water. Two Quincy #D325 air compressors, dirven by 5 hp. Fairbanks-Morse Motors furnish air for engine starting, clutches, controls and air whistle.

The *Lady Mignon* has two independent steering systems of the St. Louis Ship standard electro-hydraulic follow-up type. One system actuates two steering rudders and the other actuates four flanking rudders. The vessel's hot water heating system consists of an oil fired automatic boiler supplying the convector radiators. Separate electric heaters are furnished for the wash water and potable water. On the forward deck is a 10 hp. motor driven Schoellhorn-Albrecht double-barrel capstan and two 40 ton Nabrico hand winches.

Alco Earnings Show Gain

Earnings of Alco Products, Incorporated amounted to $4,321,000 in 1955, according to the company's annual report. This amounts to $1.90 per share, compared with $1.83 per share in 1954. In addition, Alco received $3,663,000 in a special dividend from the Montreal Locomotive Works, Limited. Including this dividend, equivalent to $2.07 per share, Alco net income for $1955 amounted to $7,984,000, or $3.97 per share.

Alco's 1955 sales amounted to $120,692,000 compared with $187,222,000 for 1954. Sales of regular products increased by $10,153,000 for the year, so that the lower total volume was accounted for by a decrease in combat tank business amounting to $76,683,000. Diesel-electric locomotive shipments were almost double those of a year ago. Even with this larger volume, products other than locomotives accounted for 57% of the total shipments of the company's regular products.

According to Perry T. Egbert, Alco president, an important action taken during the year was redemption of 102,700 shares of outstanding preferred stock in July. An additional 50,000 shares were redeemed early this year, leaving only 37,000 shares outstanding at present. He pointed out that further progress was made in broadening the base of Alco's efforts during 1955. He said that the company commenced an expansion program at its Latrobe, Pa. plant, which is scheduled for completion in 1957 and will amount to more than $7,000,000. Included in this program are new facilities for an expanded line of rings and forgings, and equipment for production of leaded steel—a new steel product. In addition, Mr. Egbert said that Alco started construction of the Army Package Power Reactor, a 2000 kw nuclear generating station, and has introduced numerous specialty products to the atomic energy industry.

The company also developed new types of locomotives and diesel engines for its railroad customers, increased sales of its stationary and marine diesel engines, and introduced new components for guided missiles and other products for new company markets in 1955, he reported. In speaking of 1956, Mr. Egbert stated that the company expects sales of regular products will be greater than in 1955. He pointed out that with shipments under a $73,00,000 contract for Army combat tanks, Alco's total sales should reach a high level for the year.

Swedish Visitor

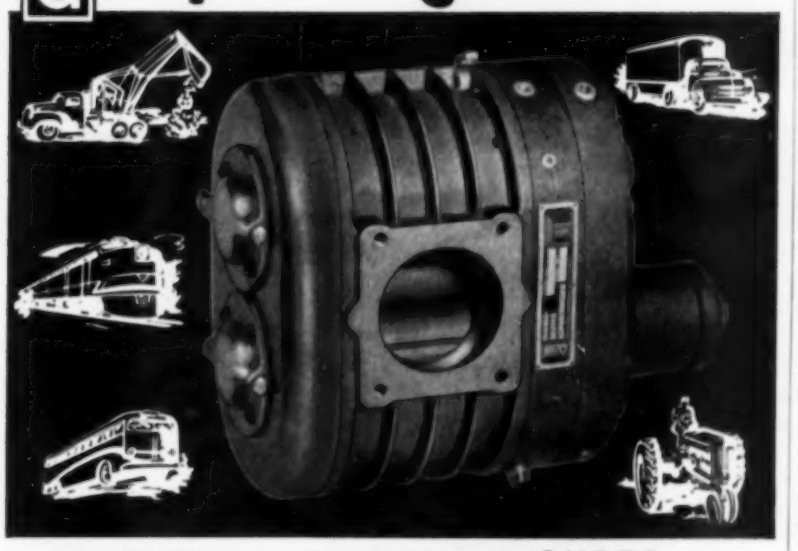
Traffic problems aren't confined to the United States—they have them in Sweden, too, according to a visitor currently studying the automotive industry in this country. Arne Tensjo, sales promotion and market research director of one of Sweden's largest truck and bus manufacturers, who is studying operations at The White Motor Company, is amazed that traffic in America moves as fast as it does.

"Such traffic jams we have in Stockholm," Mr. Tensjo said. "And they are getting worse all the time. Much worse than what I have seen in Cleveland or New York. It's a simple matter to explain. We just didn't anticipate correctly the increased flow of vehicles and do not have the roadways to accommodate it."

The number of trucks in Sweden has increased by more than 300% since 1938. However, there are still about one-fourth as many as in the entire state of Ohio.

"We have a tax of about 27 cents a gallon on both diesel fuel and gasoline which actually is about the lowest in Europe. Axle weight regulations? We have 24 Lans or counties in Sweden and each one modifies in one way or another requirements for axle loads," he said.

DIESEL ENGINES NEED
Supercharged Power



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ACCELERATE YOUR ENGINES FASTER

Wherever Diesel engines work—buses, tractors, trucks—a Miehle-Dexter Supercharger adds a big boost to performance. Power is increased by the simple addition of this compact, space-saving supercharger. That means *extra* speed at any load, *extra* pushing or pulling power at any speed, wider speed range. More, it means faster acceleration with less smoke. Add all this to engines without increasing size, weight or cost. In fact, weight per horsepower is decreased. Standard M-D models available for most engine applications. For more facts, call or write Miehle-Dexter.

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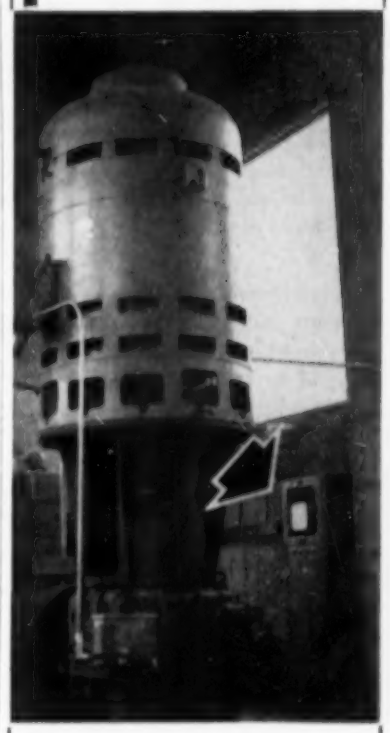

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Our complete line of Automatic engine controls together with over twenty years experience in solving difficult engine applications assures you of obtaining exactly the right control for your needs.

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MVA Convention Exhibits

Representatives of river diesel supplies and equipment were on hand with excellent informative exhibits at the Sheraton-Jefferson Hotel, St. Louis for the annual convention of the Mississippi Valley Association which was held in early February.

In its traditional spot on the main floor was the Caterpillar Tractor Company display, where the "Caterpillar yellow" chrysanthemums were distributed. Installations of Caterpillar equipment on such leading inland river boats as the *J. W. Rose, Bull Durham, Joealjim,* and *E. C. Marshall* were pictured as a part of this fine exhibit, while a good deal of time was given to the demonstrations on the D-397 and the D-337 engines which were sectioned and on hand. Bob Evans, Elmer Smith, Tom Glass, Ray Lord, Ralph Morgan, Ernie Maxfield, Al Hobem, and E. Davis, representatives for their company were on hand for these demonstrations and to dispense with other information to questions asked by these inland river leaders.

The well-lighted display of The Texas Company with its symbolic Sky Chief emblems highlighted the display made up of photos showing the vessels using Texaco lubrication. One panel was devoted to the illustration of the various distribution points for Texas lubrication and other marine products. The Texas *hospitality room* on another floor was frequented by many folks during this convention, and a number of qualified marine engineers, lubrication engineers, and marine sales managers such as Capt. D. G. Wallace, T. W. Graham, Mr. D. Lewis, and Mr. J. H. Moran, the manager of the marine sales department, were hosts at the hospitality room and at the display.

Pat McBride, the Nordberg St. Louis district manager, and the Milwaukee Nordberg crew including Mr. B. V. Nordberg, Mr. T. I. Angel, and Mr. C. O. Friend were kept busy welcoming many inland river friends at the Nordberg display. This exhibit, composed of two panels, included some fine river photography of inland river craft with Nordberg installations, along with picturing the *Irving Crown* with a large tow, and a Nordberg installation on a crusher unit. Six excellent sketches of well-known craft provided the focal point for the exhibit furnished by the Sinclair Refining Company. These sketches of inland river vessels, users of this oil company's fuel and lubrication products were made stand-outs by the banner headline "A Great Name in Oil." The manager of the corporation's sales relations, Mr. W. F. Farrell, Mr. W. N. Damonte, vice-president of marine sales, Mr. J. F. Dreitlein, inland waterways division operating manager, Mr. H. A. Stark, assistant manager of lubrication sales, and Mr. D. D. MacDermott, operating manager of the Great Lakes division, all well-known among inland river circles were some of the Sinclair representatives on the welcoming staff at the display.

At the White Diesel Engine display were Mr. H. F. Clark, advertising manager, Mr. J. H. Newton, sales manager, Mr. Jack Lichter from Chicago, Mr. G. Bader, St. Louis, and Dick McCloskey, the Ohio River representative. The point of interest for this group of wire panels was directed to the proof performance of fuel savings as resulted from the 1400 hp Superior engines.

The St. Louis representative of the Bingham Pump Company, Bob Jarrett, and Ron Veara, the Chicago rep, were busy at the big eight foot display. Here the detailed operation of the firm's products were outlined for easy understanding, presented for effective display.

Color, motion, and sound were teamed up to present an excellent demonstration on the OP diesel engine, presented by the Fairbanks-Morse and Company, Chicago, with a number of the Fairbanks team on hand for greeting and additional information. This welcoming group included Mr. C. E. Dietle, general manager of marine sales, Chicago; Mr. John True, diesel dept. manager, Cincinnati; Mr. Walter Marx, factory river rep; Mr. William Wright, diesel department manager, Chicago; and John Winters, John Michel, and Bob Zub.

Mr. Carl Fritz was at his station at the Morse Instrument Company's display. This exhibit featured the single-lever MD-24 marine engine control for diesel engines, along with a marine indicator "Chargicator," which shows the marine battery condition from the pilothouse. Two light duty controls for gasoline engines completed the display.

Song and music with a good deal of fine fellowship came from the hospitality room of the Cooper-Bessemer Corporation. Hosts to the many visitors to this room during the three-day convention were Charles Regale, Bill Arthur, George Dudley Yeomans, A. A. Albright, H. A. Gehres, R. C. Hamilton, W. T. Malone, and Ralph Reynolds.

Up on the 11th floor, Mr. C. S. Tyler, along with Larry McDonald, Dick Wall, and Karl Marston, were busy welcoming visitors to the Socony Mobil Oil hospitality rooms, renewing and initiating many new and old friendships there.

Visitors to the Wartenbe Filters, Inc., hospitality rooms found friendliness and a good deal of basic information regarding the new full flow Bartenbe filter, both friendliness and information dispensed generously by David R. Wartenbe, and Miss Cledith De Noon.

The General Motors Party, which required about four dining rooms of the hotel to handle the crowd of about 700 inland river folks, at the Lennox Hotel, was credited as one of the most enjoyable events of the meeting. Many of the well-known General Motors group were present, including the general manager of the Cleveland Diesel Division, Tom Hughes; other Cleveland members John Brophy, Roger Williams, Steve Dowell, Stuart Ramsay, Roland Frye, Robert Kilborne, John C. Stocker, and Ben Gommel; the St. Louis group included George manager C. L. Barnard, and Harry Gommel; the St. Louis crowd included George Schulte, Pete Barrere, and Joe Elliott. Daniel Smith was present from his Pittsburgh activities, and Robert Bay was there from Chicago.

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MERLIN EQUIPMENT AVAILABLE!

To serve the many American companies who have asked for its world famous Diesel production and maintenance machinery, Merlin Engineering Co., Ltd. of England will build an American sales and service organization.

SHOW! Starting April 9th in New York City, the Merlin Servicemaster high precision grinder for fuel injector nozzles and needles, and the Merlin Calimaster for calibrating fuel pumps, and for other Merlin test equipment will be on display and demonstrated by Merlin engineers.

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Shipping Contracts

The current report of the American Bureau of Shipping mentions the following contracts entered into for the month of January: Alexander Shipyard, 3 towboats of 1800 hp each for Commercial Transport Corp., Houston, Texas. Dravo, a 2400 hp towboat for A. L. Mitchling Barge Lines and another for stock. Gulfport Shipbuilding Corp., a 96 ft. 1000 hp tug for General Motors. Higgins, Inc., two 600 hp twin screw cargo boats for Halliburton Oil Well Cementing Co.

Cummins Expansion

Cummins Engine Company, Inc., Columbus, Indiana, has announced a $6,000,000 capital program for 1956, including construction of a 73,000 square foot addition to its manufacturing plant. It was further stated that upon completion of the 1956 program, Cummins will have expended $17,300,000 on capital additions in the six year period beginning in 1951 when its first major plant expansion program was initiated.

In connection with this announcement, R. E. Huthsteiner, president of the Indiana diesel manufacturing firm, said: "We are also taking steps to increase immediately the production rate of Cummins diesels by an additional 17 per cent.

This is over and above the 21 per cent increase that was announced in January. The new production rate will be the highest in the Company's 37-year history and further reflects the continuing acceptance of Cummins diesels in all markets which the Company serves. Final sales figures for 1955 showed an increase of 36.9 per cent over 1954, or $81,000,000 as compared with $59,185,000. Much of this increase was due to the application of the Cummins line of Turbodiesels in many new types of equipment. We expect production to be maintained at the current high level throughout 1956."

The 73,000 square foot, single-story manufacturing building will be of the same 80-foot clear-span type on which the company has standardized in recent years, and will therefore be suitable for all types of manufacturing operations. The new building will provide space for additional production machinery now on order.

General Purpose Shut-Off Solenoid Valve

A new ¾-in. general purpose 2-way solenoid valve with a full area port has been introduced by the Automatic Switch Company of Orange, New Jersey, designers and manufacturers of solenoid valves and electromagnetic controls since 1888.

This new self-contained, internal pilot operated Bulletin 8201A solenoid valve has a forged brass body and bonnet and a hycar diaphragm. Available normally closed, opens when solenoid is energized, or normally open, opens when solenoid is de-energized, this valve can be mounted in any position.

Just three operating parts are utilized—a stainless steel core and spring and a hycar diaphragm. Packless construction is used; no stuffing boxes or sliding glands to leak or require maintenance are needed. Valve handles oil, water, gas, etc., up to 125 psi. Continuous duty Class A coils require just 10.5 watts ac, or 10 watts dc to operate. Available with either pressed steel, water-tight, or explosion-proof solenoid enclosure. Explosion-proof enclosures are "UL" approved and listed for Class I, Group D and Class II, Groups E, F and G hazardous locations.

Luxolene molded coils for extreme humid or moisture conditions and dual voltage coils can be provided.

Write the manufacturer for four page color brochure describing this new ¾-in. valve. (ITS NEW)

Names New Manager

George C. Rodgers has been named manager of the Engine and Compressor Department, American Air Filter Company, Inc., according to W. G. Frank, president. Rodgers succeeds the late Charles Sowerby who died last year. In addition to his new duties, he will continue as manager of Military Products. He has been with the Herman Nelson Division of American Air Filter Company for the past five years. Prior to being named manager of Military Products, he was manager of Special Products.

A native of Elkins, West Virginia, he is a graduate of Davis-Elkins College with a degree in general engineering and George Washington University with a Bachelor of Law degree. For five years prior to joining Herman Nelson and American Air Filter Company, he was a representative for the Society of Automotive Engineers at the Bureau of Standards in Washington. During the preceding 15 years Rodgers was employed by the Curtiss-Wright Corporation as a development engineer and as manager of its electronic and rocket propulsion division.

Increased Air-Cooled Diesel Production

During the first 10 months of 1955 the Kloeckner-Humboldt-Deutz A.G. has increased production of its air-cooled diesels as compared to 1954 by 65%, to 20,000 cylinder units monthly. This company has now reached a combined production of 150,000 diesel engines for the past five years and is today considered one of the world's largest diesel engine manufacturers. Smalled air-cooled engines are turned out on an assembly-line, the larger engines are built according to individual specifications. The firm makes a specialty of supplying engineers and technicians who will install the engines when this is required.

On a visit to the plant, one can see a large 2,000 hp engine designed for a ship in Hamburg and a smaller 300 hp engine designed for Teheran, in Iran. The firm has opened up markets in India and Pakistan, in Thailand, Burma and the Philippines. There are no dealings with those countries behind the iron curtain.

Kloeckner-Humboldt-Deutz A.G. is represented in the United States by Diesel Energy Comporation of 82 Beaver Street in New York City. A nationwide sales and distributor net has been established in the United States.

Cleanable, Micronic Filter

Newly designed, all metal, edge type, liquid filter, Super Auto-Klean, stops micronic particles and is cleanable without interrupting flow. This new filter has been designed specifically for lube, fuel and hydraulic liquids on diesels, machine tools and special machinery. Catalog No. SAK-057 describes how this small filter with high flow rates affords lower operating and installation costs. Diagrams showing principles of operation and construction are included together with flow curves and housing specifications. Eight pages. The Cuno Engineering Corporation. (ITS NEW)

Marine Diesels

Every vessel in the miscellaneous group built in the United States last year in the 100 to 2000 gross ton range was powered with diesels. The number was 98 compared to 86 in the previous year and the total power was over 100,000 compared to slightly more than 64,000 the preceding year.

THE NEW MODEL E
KAHLENBERG DIESEL
400 to 1100 BHP
300-400 RPM

Kahlenberg

NEW TURBOCHARGED
TWO STROKE DIESEL

- HIGH OUTPUT
- LOW FUEL CONSUMPTION
- LESS WEIGHT PER H.P.
- LESS SPACE
- LOW R.P.M.

This ultra-modern new two stroke Diesel embodies many exceptional features including welded frame construction, self-sustained exhaust turbocharging with resultant high output, low fuel consumption, and less weight per horsepower in a heavy duty engine, extremely compact, accessible, and with the low rpm which spells long life at lowest maintenance cost.

Kahlenberg Model E Series Diesels are available for marine or stationary service in units from four to eight cylinders conservatively rated 400 to 1100 BHP, 300 to 400 RPM rated speed range, and direct reversible for marine use. Write for additional information giving details of your power requirements.

KAHLENBERG BROS. CO.

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MANUFACTURERS OF KAHLENBERG DIESELS, AIRHORNS, PROPELLERS, AUXILIARIES

...and we quote...

A design engineer writes about DIESEL ENGINE CATALOG, Volume 20 . . . "It has the attractive make-up and complete presentation for which it has been known and which makes it an excellent source of information."

An accessory manufacturer writes . . . "The model identifications of the various diesel engines will be valuable to us in our efforts to accumulate engine torque specifications."

A top filtration expert writes . . . ". . . have been through DIESEL ENGINE CATALOG, Volume 20, from cover to cover and can only say I would not think it was possible to make so many improvements over the last issue. It is a magnificent job and I know it will be used frequently by me."

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Volume Twenty

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General Manager of Morco

D. F. Clark

C. H. Kimmel, president of The Ohio Crankshaft Company, recently announced the appointment of David F. Clark as General Manager of Ohio's subsidiary Morco, Incorporated. Morco, located at 23001 Aurora Road in Bedford, is engaged in the reconditioning of diesel engine crankshafts. The company is pioneering an exchange program which enables a diesel engine user to exchange a worn shaft for a recondtioned unit through a coast-to-coast set-up of diesel engine dealers. Prior to his present appointment, Mr. Clark was a senior project engineer at Ohio Crankshaft Company since 1951. His previous experience was in sales engineering work with the Gates Rubber Company of Denver and Ohio Rubber Company of Willoughby.

"Vest Pocket" Purse Seiner

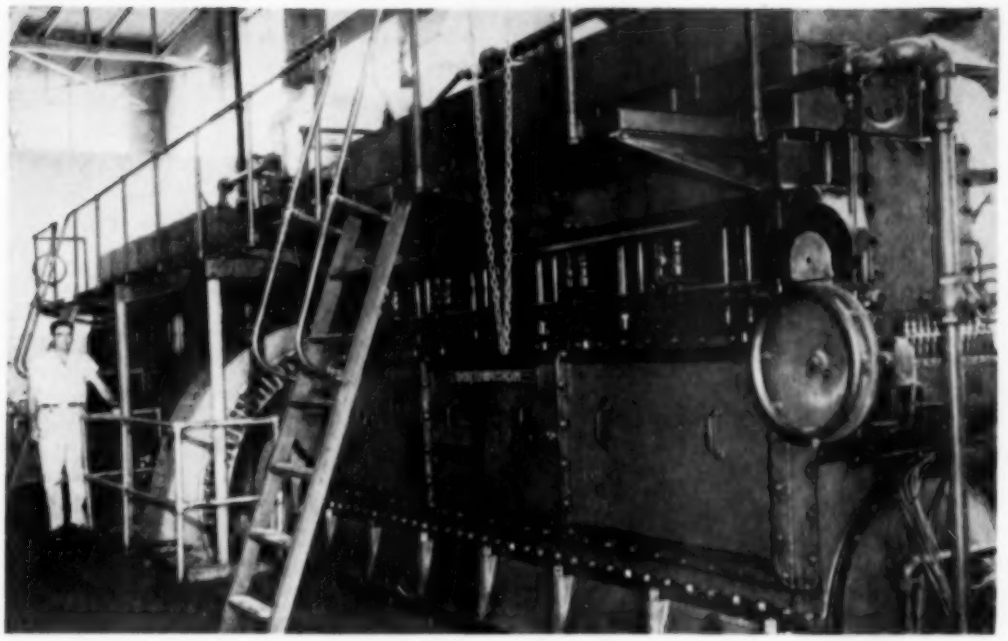
George Gregory, fisherman of Everett, Washington, is shown aboard his "vest pocket" purse seiner *Bunny G.*, which was recently repowered with a General Motors 4-51 diesel. The craft, which is operated part-time in Alaska waters, is only 38 feet long, but has all the seining equipment usually carried by 55-foot "Alaska limit" seiners. Payload capacity is approximately 2500 average-size salmon. The craft has been logged at 8.5 knots with the new diesel turning a 26 in. x 16 in. wheel through 2.5 to 1 reduction gears.

Launches Minesweepers

With the launching of three 171 ft. non-magnetic minesweepers on contract with the Peterson Builders Inc. of Sturgeon Bay, Wisconsin, contracts were taken by the same yard to build three more slightly larger vessels for the same service. The craft are all diesel propelled. It is expected that another of the 171 footers will be completed by the time this goes to press at the Luders yard at Stamford, Connecticut. Completion of another of these all wood 675 ton ships will take place within a short time at the Tacoma Boat Building Company yard in the Puget Sound city for which the yard is named.

Come to think of it, what was the good of spending so many years devising the best way to turbocharge and supercharge without at the same time finding a way to make men clean air filters to let the air into the charger.

Additive Cleans Engine



THE 16 in. bore by 20 in. stroke, 12 cylinder, 4 cycle Worthington gas-diesel engine in the electrical production department of the City of Lafayette, La., was given an internal cleaning without the loss of a single hour of operation. This was achieved through the application of a carefully worked out plan of fortifying the lubricating oil with Micro-Lube over an extended period of several months.

The plan was developed and put into operation by Mr. Roy P. Hebert, superintendent of electrical production, in collaboration with the lubrication engineering division of Micro-Lube Sales, Dallas, Texas. The manner in which the program was carried out, was as follows: An examination of the engine revealed that efficiency deterring substances had accumulated.

Ten percent (30 gals.) Micro-Lube was added to the 300 gallons lubricating oil capacity of the engine, and filter packs changed. After the oil filter packs were changed, a cleanliness test of the lubricating oil showed a marked decrease in the amount of lacquer and other contaminating carbonaceous substances. The lubricating oil was not changed, the normal oil loss was replaced and Micro-Lube in recommended percent added thereto. At each crankcase addition a 10% blend of Micro-Lube was included. After several months continuous operation under the program, the power output remained at the same high level.

Sub-zero Lubrication

The ingenuity and imagination of modern day heavy equipment manufacturers is proving more than a match for Mother Nature. Today's herculean earth moving equipment is capable of effecting astounding alterations on the earth's natural contours. Various other forms of equipment have demonstrated their ability to maneuver on almost all kinds and consistencies of terrain.

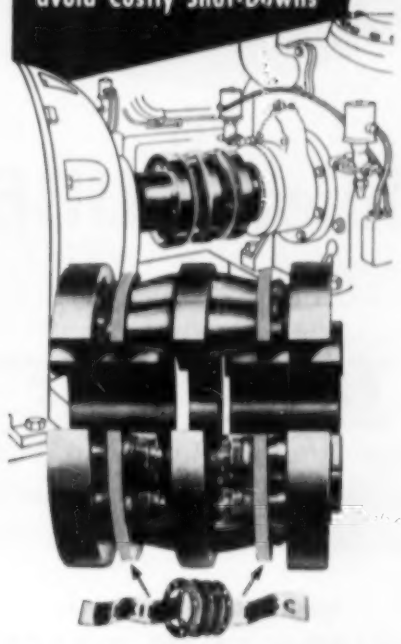
Now even the great northern ice cap, one of the most formidable of Mother Nature's heretofore forbidden domains, has been partially tamed by man-made surface transportation. The latest conquest is that of the gigantic LeTourneau Sno-Freighter, a 274-foot, six-section pneumatic tired transporter, which recently was driven to the Arctic Ocean. With decks more than eight feet off the ground and a carrying capacity of 150 tons, this diesel Goliath was built for Alaska Freight Lines. It will be used to service the "Dew Line," a string of radar stations jointly built by the United States and Canada across the top of the continent.

Among the unique features of the Sno-Freighter are 24-wheel drive and self tracking. The former is accomplished through installation of individual electric motors and gears for each wheel. The self-tracking feature assures that every car in the train follows the identical tracks of the first car.

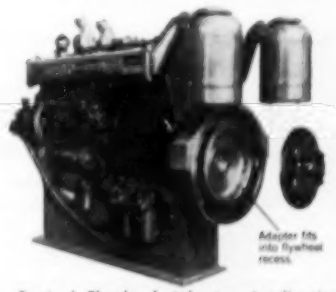
Construction of a trackless train that would navigate under "deep freeze" conditions was not the only consideration on this Arctic caper. Choice of fuels and lubricants which would do the job, even when temperatures dipped as low as 65 degrees below zero, was another. The problem was one of finding fuels and lubricants that would not freeze up in storage, yet would display the required properties under warm running conditions. In the case of diesels this means as high as 200° F.

Because of its excellent pour characteristics at low temperatures, among other properties, RPM DELO Supercharged No. 1 lubricating oil was considered the right lubricant for the Sno-Freighter's generator engines, while Standard Alaska diesel fuel provided the power. RPM 10-30 Special motor oil did the job in the crankcases of the bulldozers that accompanied the Sno-Freighter. Chevron starting fluid and Ban-Ice motor fuel ice preventive also proved helpful on the trip.

Specify THOMAS ALL METAL FLEXIBLE COUPLINGS for Power Transmission to avoid Costly Shut-Downs



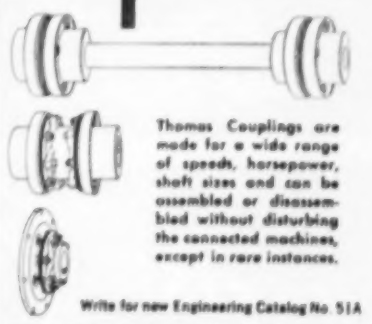
Patented Flexible Disc Rings of special steel transmit the power and provide for parallel and angular misalignment as well as free end float.



Typical Flywheel Adapter Application

DISTINCTIVE ADVANTAGES

FACTS	EXPLANATION
NO MAINTENANCE	Requires No Attention. Visual Inspection While Operating.
NO LUBRICATION	No Wearing Parts. Freedom from Shut downs.
NO BACKLASH	No Loose Parts. All Parts Solidly Bolted.
CAN NOT "CREATE" THRUST	Free End Float under Load and Misalignment. No Rubbing Action to cause Axial Movement.
PERMANENT TORSIONAL CHARACTERISTICS	Drives Like a Solid Coupling. Elastic Constant Does Not Change. Original Balance is Maintained.



Thomas Couplings are made for a wide range of speeds, horsepower, shaft sizes and can be assembled or disassembled without disturbing the connected machines, except in rare instances.

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Nordberg Appointments

H. W. Dow, Jr.

T. J. Angel

R. P. McBride

Three appointments in the Sales Department of the Heavy Machinery Division, Nordberg Manufacturing Company, are announced by R. W. Bayerlein, Division vice president. Mr. H. W. Dow, Jr. has been appointed special representative of the Heavy Machinery Division. Mr. Dow will work under the direction of A. R. McMullin, manager of Nordberg's New York office, on diesel engine sales throughout the New England area. Mr. T. J. Angel, district manager of Nordberg's St. Louis territory has been named staff assistant to the vice president, Heavy Machinery Division and will make his headquarters at the main Milwaukee, Wisconsin office.

Mr. R. P. McBride, sales representative in the Iowa territory, has been appointed the new district manager of the St. Louis territory. He will make his headquarters in St. Louis, Missouri and in addition, will continue to represent Nordberg in the State of Iowa.

"Mary Caroline"

The *Mary Caroline* is the newest patrol boat to be put in service by the Law Enforcement Division of the Massachusetts Department of Natural Resources. She is one of three similar craft now patrolling state coastal waters to enforce state fishing laws.

The craft was designed by Bertram Frost and built at the Frost Boat Works in South Portland, Maine. She has an overall length of 39 feet, a beam of 13 feet and a draft slightly over three feet. Powered by a six-cylinder General Motors inclined diesel supplied by the Walter H. Moreton Corporation of Cambridge, the *Mary Caroline* has a speed of 14 knots at 1800 engine rpm. The diesel turns a 22-in. x 24-in. wheel through 1.5 to 1 reduction gears. Accommodations include four berths, toilet and galley. Constant communication with conservation officers on shore is by radio telephone.

Dieselized Loader

A highway maintenance truck from the town of Shirley, Massachusetts, takes on a load of sand from a Model 135 Haiss Loader, manufactured by the Pettibone Mulliken Corporation, Rome, New York. Owner of the new loader is the San-Vel Contracting Company, Littleton, Massachusetts. Operator George McDowell reports that the machine will load 15 yards of sand into a large dump truck in one minute and 45 seconds. Power for the loader is a 110 horsepower Model HRCI-400 Cummins diesel.

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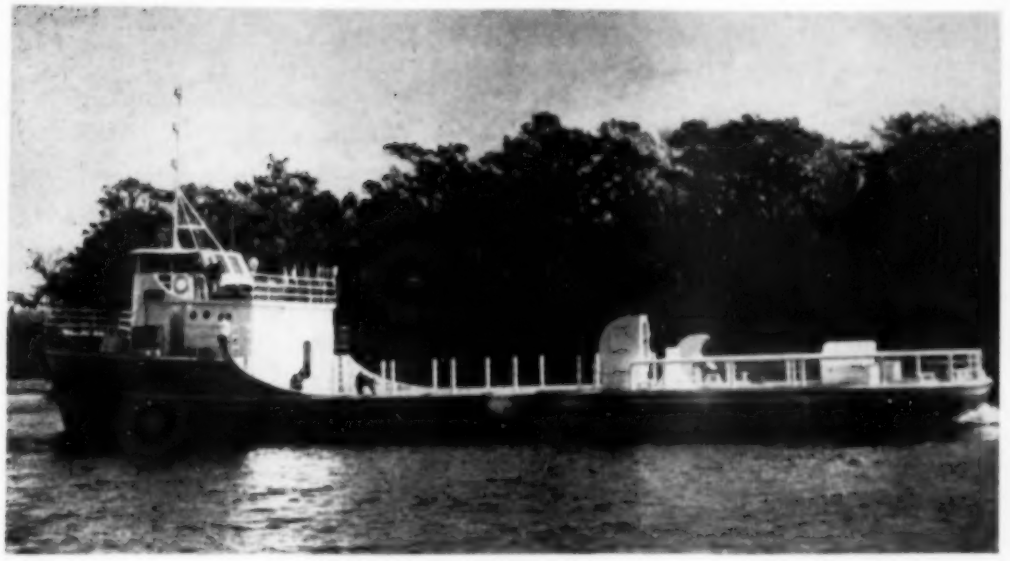
Twin Screw Supply Vessel



LATE last year, Equitable Equipment Company of New Orleans delivered the M/V *Tioga*, first of two twin screw 131 ft. supply vessels built for The California Company for service offshore. The M/V *Tioga* has gone into service delivering drill stem, casing, mud, cement, fuel oil and fresh water to the many fixed and portable drilling platforms operated by The California Company in the Gulf of Mexico. The ship was built at the Madisonville Yard of Equitable.

The M/V *Tioga* was designed by Friede and Goldman, Inc., Naval Architects and Marine Engineers of New Orleans, and has the following characteristics: Length over-all, 131 ft; length between perpendiculars, 125 ft.; and draft, 6 ft.

The *Tioga* was designed to operate from a shallow water base, to have utmost maneuverability, to operate in the open sea far off-shore, to carry the maximum deck load, to have quarters for 40 passengers and to have efficient towing characteristics. The design of a shallow draft, fully shaped ocean-going vessel as illustrated, having twin screws, twin rudders, with deck house, pilot house and all quarters forward, and wtih towing bits located for maximum towing efficiency, has achieved the desired results in a most satisfactory manner. All crew quarters, passenger space, and pilot house are air-conditioned.

The main engines consist of two Caterpillar diesels, 450 hp each. The auxiliary engines are General Motors. The air compressor is Gardner-Denver. The *Tioga* was built to the requirements of the American Bureau of Shipping and in accordance with the United States Coast Guard Rules for safety of life and fire fighting at sea.

Sales Manager of Quincy

Loren Gillhouse

The appointment of Loren Gillhouse as sales manager of Quincy Compressor Co., Quincy, Illinois has just been announced by the firm's president, Mac Irwin. Mr. Gillhouse assumes his new duties after five years as Quincy's assistant sales manager. He has also served as regional sales manager for Quincy. He earned the rank of major in the infantry during World War II and is a graduate of the University of Illinois with a bachelor of science degree in business administration.

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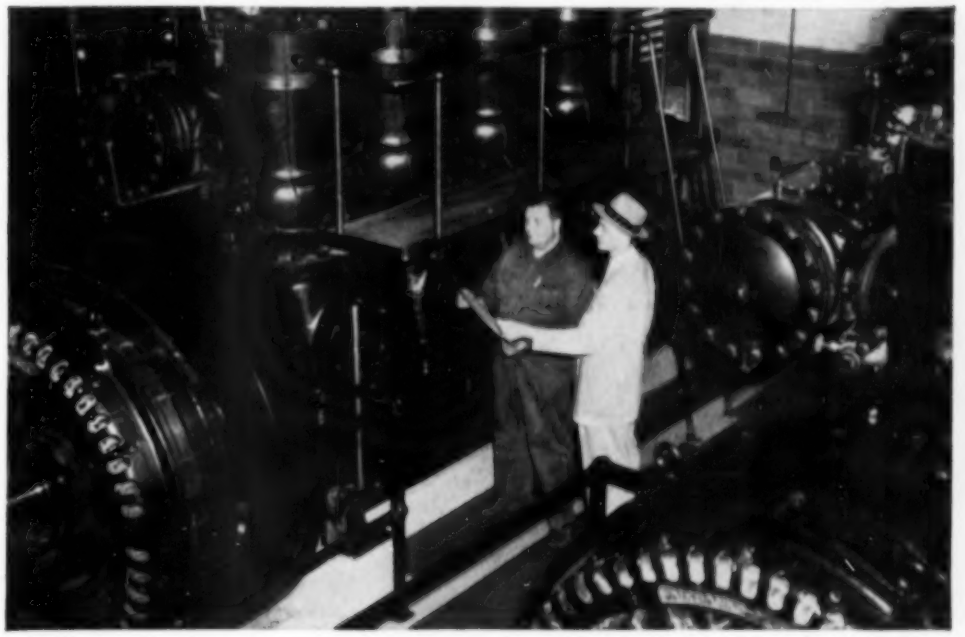
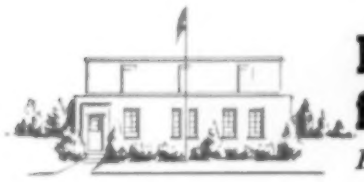


Melvin Nissen (left) plant superintendent Graettinger, Iowa, and Standard Oil lubrication specialist R. R. Spargo inspect maintenance records. Assisting customers with lubrication problems is something for which Bob Spargo is well qualified. He is a mechanical engineer with a degree from Iowa State College and a graduate of the Standard Oil Sales Engineering School. Bob has been providing lubrication technical assistance to Standard customers for nearly nine years. Customers find his experience and training pay off for them.



How STANDARD D&G Oil helped lick five problems in one plant

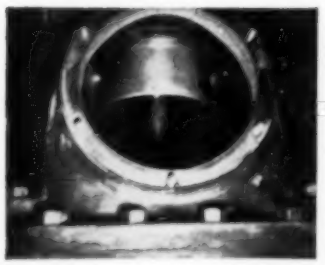
Excessive deposits, excessive maintenance, high oil consumption, were among problems solved by change-over to STANDARD D&G Oil at Graettinger, Iowa, Municipal Light Plant

Three years ago the Graettinger Municipal Light Plant began using STANDARD D&G Oil. Prior to this change-over, good engine performance was hampered by:

1. Excessive carbon deposits
2. Excessive port carbon
3. Stack fires
4. Ring sticking
5. High oil consumption

The plant averages 4.3 million HP hours of operation annually. Before changing to STANDARD D&G Oil, ports had to be cleaned several times a year. Now, with STANDARD D&G Oil in the engines, ports aren't touched between annual overhauls. Ring sticking and piston and cylinder deposits are virtually eliminated. All of this has been accomplished while continuing the use of low cetane, low gravity fuel.

Good management, careful maintenance and STANDARD D&G Oil have teamed to deliver this performance at Graettinger. Maybe you would like to use STANDARD D&G Oil to obtain similar performance from your engines. A Standard Oil lubrication specialist is nearby in any of the 15 Midwest and Rocky Mountain states ready to show you. Call him. Or write Standard Oil Company, 910 South Michigan Avenue, Chicago 80, Illinois.



Piston of one of F-M engines at Graettinger Light Plant. STANDARD D&G Oil has kept maintenance down, cut piston and liner wear.

Quick facts about **STANDARD D&G OIL**

1	Made from highest-quality solvent-refined stock.
2	Contains additives which impart superior detergent-dispersant and anti-corrosion properties.
3	Anti-foaming.
4	Oxidation resistant.
5	Recommended for use (1) with economy fuels, (2) in extreme-load and/or low temperature service.

Standard man Bob Spargo (left) and plant superintendent Melvin Nissen inspect piston through crankcase inspection plate hole. With STANDARD D&G Oil, light plant has cut oil consumption in half.

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